

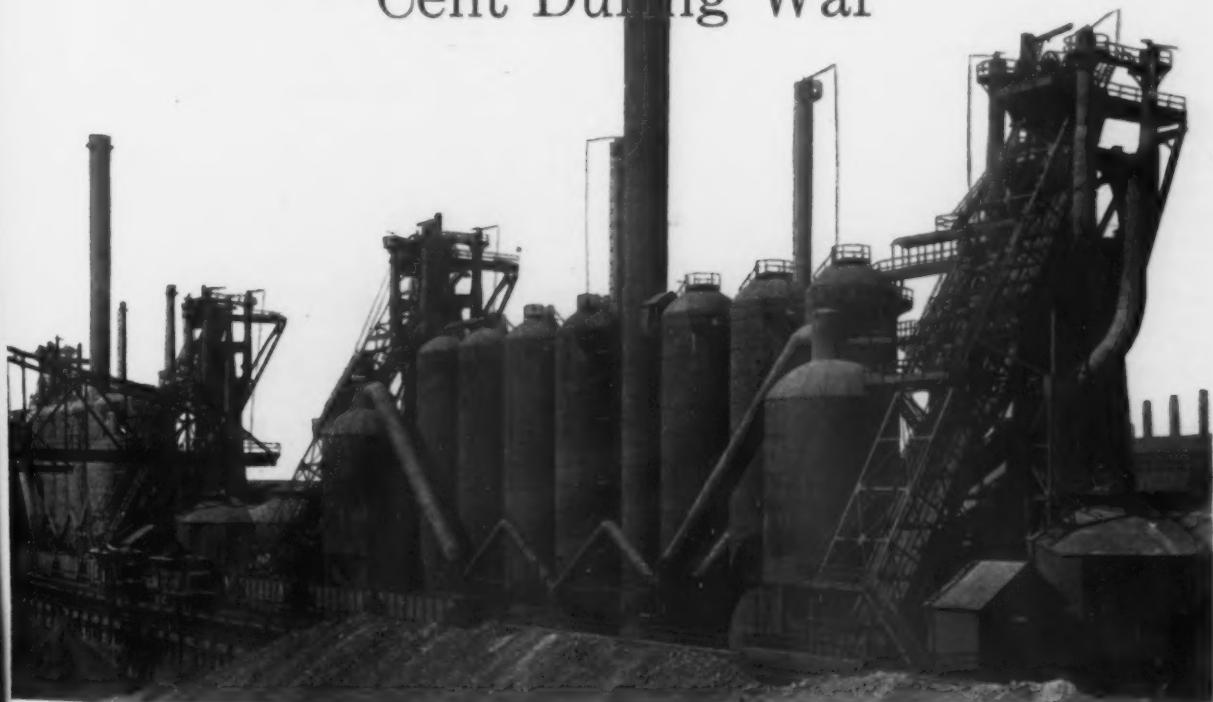
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Gary Works Expanded Fifty Per Cent During War



Two Coke Oven Batteries, Four Blast Furnaces, Duplex Plant, Wheel Works, Blooming, Sheet and Merchant Mills Added Under Impetus of Conflict

BY GILBERT L. LACHER

THE plant of the Indiana Steel Co. is known throughout the world not only as the largest existing steel works, but as an industrial giant which sprang up in a few years on what had been a desolate stretch of sand dunes bordering the southernmost extremity of Lake Michigan. Unlike older plants which expanded gradually through additions made from time to time to keep pace with the growing demand for their products, the Gary works was constructed in accordance with carefully prepared plans which established the interrelation of all the various units of the plant, whether proposed for immediate construction or projected for erection at a distant date. Consequently the company was not caught unprepared when the Great War suddenly multiplied the consumption of steel and called for a proportionate increase in productive capacity. It is not to be inferred, however, that the existence of these plans made their execution easy. On the contrary, labor shortage and

war-time priority rulings governing the disposition of materials, proved obstacles which were surmounted only through perseverance and resourcefulness. The additions which were erected in the face of adverse conditions are testimony to what American industrial genius can accomplish, and are of a magnitude not generally appreciated. Although the new units have been briefly noted in our annual review numbers, necessary war-time precautions restricted the issuance of information concerning construction activities and prevented their receiving publicity in keeping with their importance. The very scope of the work done precludes a detailed description even at this time and, therefore, attention will be centered on the novel and outstanding features in the new construction.

Gaging the additions by the number of blast furnaces, the plant was expanded 50 per cent, four furnaces having been added to the existing eight. As the new furnaces are of larger capacity than the

older ones, the increase in capacity was even greater than that percentage. Complementary additions included new coke oven batteries, an ore yard extension, increased blowing engine and power generating capacity, enlarged water pumping facilities, a duplex steel furnace unit, a 40-in. blooming mill, new soaking pits, a 160-in. sheared plate mill, a rolled steel wheel plant, 10-in. and 20-in. merchant mills, new tie-plate finishing equipment, and necessary increases in roll shop, machine repair shop and foundry facilities. The immensity of the works as it now stands may be grasped when it is learned that its capacity is approximately 265,000 tons of steel per month. Tonnage figures, however, do not tell the whole story, as Gary has extensive equipment for rolling small sizes of merchant bars, which represent more labor and rolling time per weight than heavier forms of finished material.

The premier steel works both from the standpoint of plant facilities and of tonnage output, the Gary plant still has room for further growth. Its site comprises 1140 acres and the original plans provide for four additional blast furnaces and steel making and finishing capacity in proportion. This article, however, is concerned with what has been done rather than with what is projected for the future. In considering war-time extensions, it may be noted that the first unit to be added was a benzol plant to serve the by-products coke ovens. This work, however, was not undertaken to increase the steel capacity of the works, but rather with a view to recovering the by-products from the coke oven gas, thereby conserving what was formerly not utilized. The benzol plant was completed in the fall of 1915, and the additions to the works subsequently made were more strictly related to war demand for steel, as they all contributed to an increase in output. Among these were 140 coke ovens, which were added to the existing coking facilities comprising 560 ovens. The new batteries are of the Koppers type and differ little from the original installation, one of the principal deviations in design being the location of the collecting mains on the pusher side of the ovens instead of the delivery side. Complementary additions included another series of track hoppers at the coaling station, crushers and breakers, an extension to the coal conveying system, a coke wharf, coke screening station, extension to boiler house, new saturators, three turbo-exhausters, boosters, and another 30-in. cast-iron pipe main to conduct the gas to the steel plant distributing station. Of the added equipment, the coke wharf represents a departure from previous practice, as the older batteries are not provided with wharves but are served by elevated screening stations. Another addition to the coke plant facilities was the installation of a third motor-driven centrifugal pump with a capacity of 30,000,000 gal. of water per 24-hr. day, thereby increasing the maximum daily output to 90,000,000 gal. In this connection it may be observed that the coke plant has its own pumping station, boiler house, machine shop and store house and, except for its dependence on the main works for electricity, castings and heavier machine work, is a self-contained unit. The site of the coke plant is east of the steel works, on the other side of a turning basin serving the ore slip from the lake.

Beginning at the raw material end of the Gary works proper, the first war-time addition to be noted is a 1000-ft. extension to the ore yard, making the total present length 3400 ft. The storage capacity of the addition is 1,000,000 tons of ore and limestone and the capacity of the entire yard is 3,200,000 tons. A Hoover & Mason ore bridge with

a span of 187 ft. between legs and a bucket travel of 300 ft. was added to the existing five bridges. The new bridge is of the same type as the older ones and like them is equipped with a 14-ton capacity bucket. On the slip side of the storage yard two new Hulett unloaders were installed. These are of heavier construction than the older unloaders and have 17-ton bucket capacity as against 10 tons for the other machines. The unloaders are electrically operated and complete an operating cycle in from 50 to 55 sec. To enable the machine to reach under the deck beams of a vessel, the bucket has been designed so that one jaw can be extended horizontally, and the entire bucket leg is arranged so that it can be rotated around its vertical axis. In July, 1920, unloading records at the Gary docks were broken, 1,060,000 tons of ore and limestone having been handled.

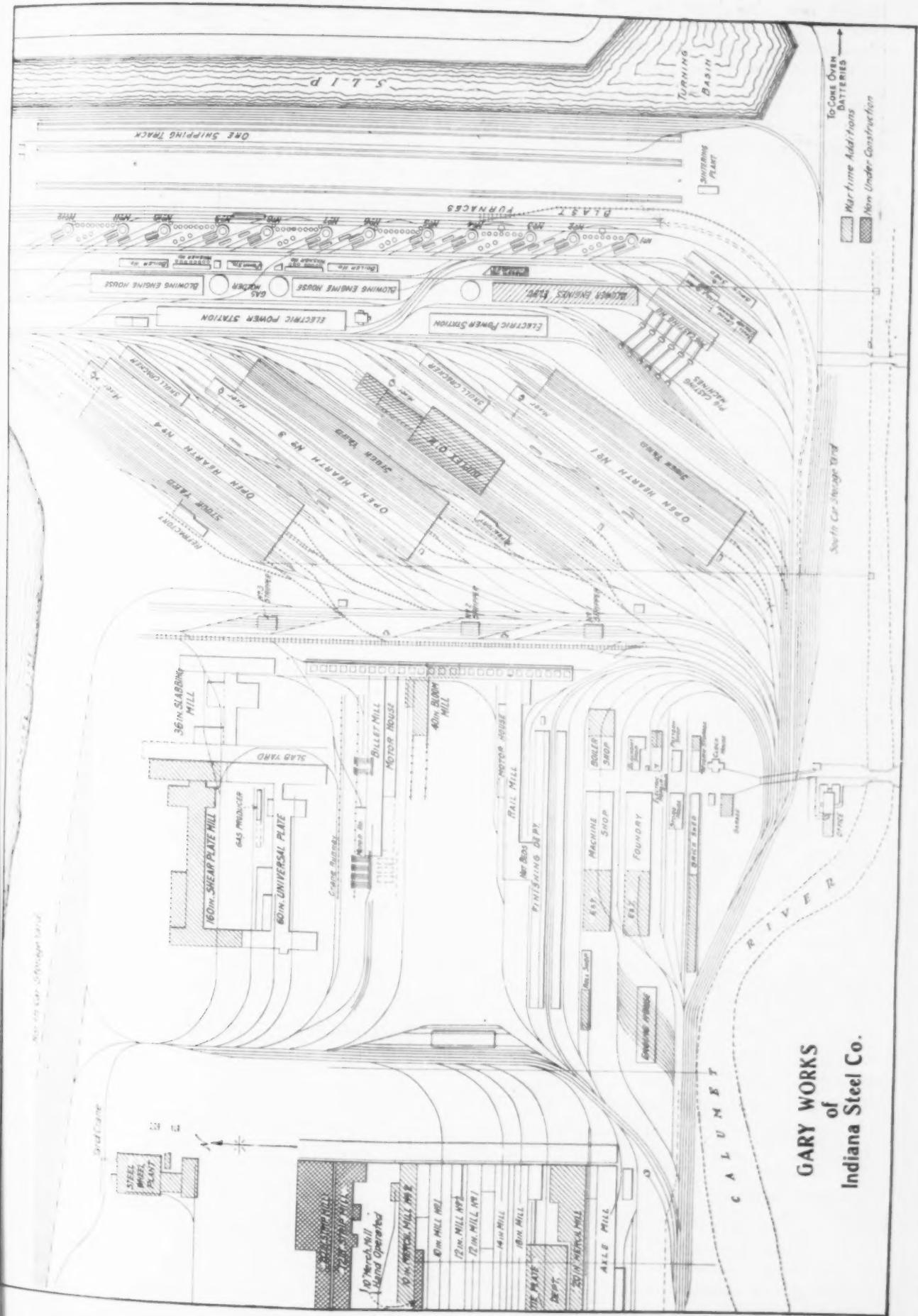
Another feature of the storage yard extension was the construction of a tunnel connecting the blast furnace side with the dock side, thereby giving employees engaged in unloading a short cut to their work.

Improvements in Blast Furnace Design

Four new blast furnaces were erected during the war period in that portion of the works south of the eight older furnaces and adjacent to the ore yard extension. Each pair of furnaces is served by seven two-pass stoves with a single stack, instead of eight with individual stacks as in the case of the other furnaces. Each of the four new furnaces is rated at 550 tons of pig iron per 24-hr. day, as against a rating of 500 tons for the older furnaces. The height of the new type of furnace from the iron notch to the top of the stock chamber is 82 ft., or 93 ft. to the top platform. The hearth is 18 ft. high, the bosh 22.5 ft. and the stock line 17 ft. in diameter. The large bell is 13 ft. in diameter and the small bell 6 ft. Bins for the furnace are of the Hoover & Mason type with rolling drum gates.

The most important difference between the new and older furnaces lies in the construction of the furnace tops. These are swelled out in dome-like shape above the stock line, and the gas off-takes, instead of being at the junction of the top with the shell, are several feet above the stock chamber on either side of the bell hopper and from there rise up 25 ft. where they connect with the downcomers. The advantage of this design is that the velocity of the gas is slackened before it reaches the off-takes and thus dust tends to drop back into the furnace rather than to pass out through the downcomers. Another feature of construction is the fact that the furnace lining is not continued into the top. On the contrary, the lining stops just above the stock line and the furnace top merely consists of a steel plate shell, the inside of which is covered with cast abrasion plates. Thus the damage done by flying stock is reduced.

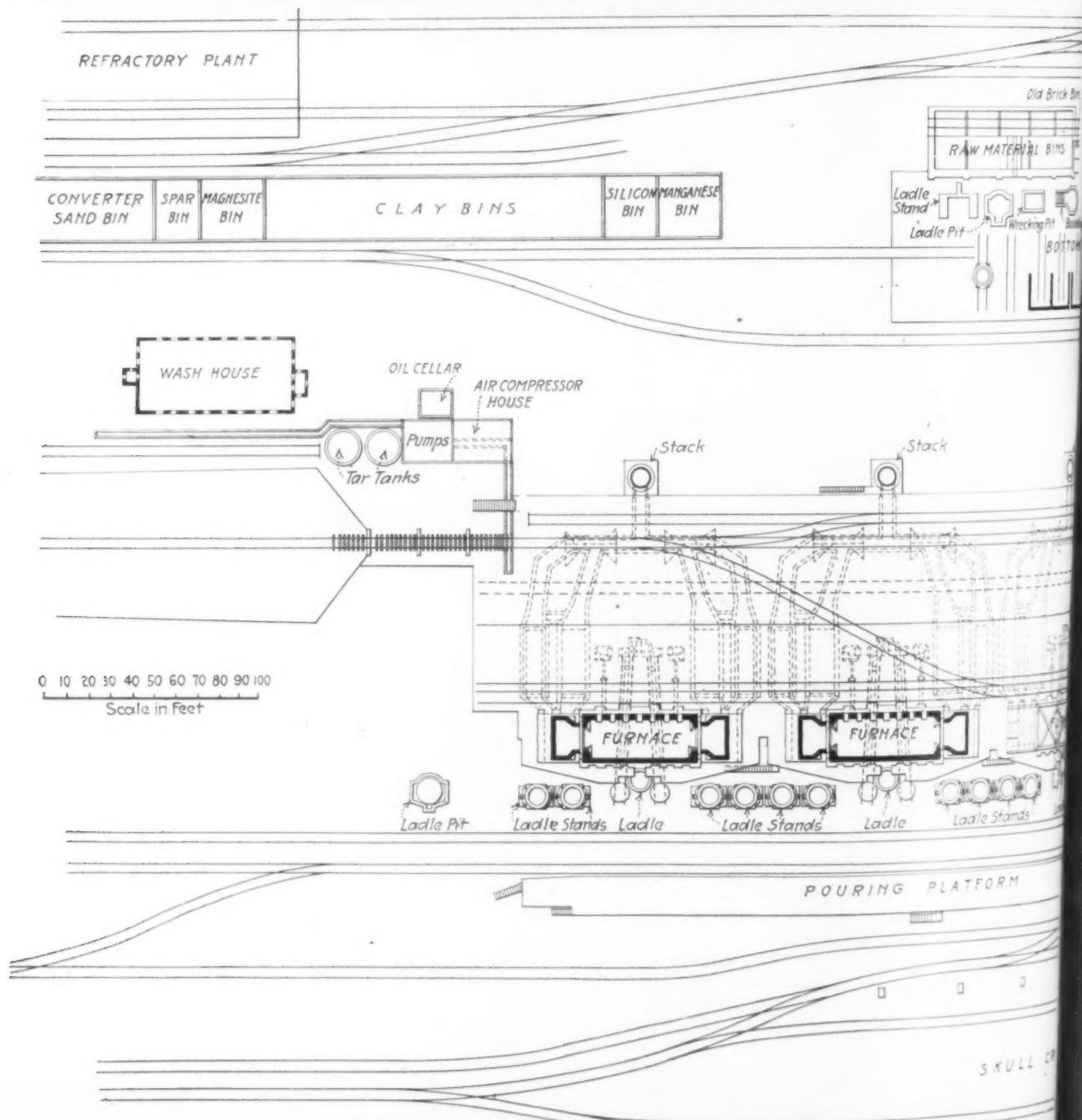
The gas washing and drying apparatus also differs from that on the older furnaces, each pair of which are served by three sets of washers. The new blast furnaces are equipped with primary washer, drier and secondary washer. Gas used for the stoves and under the boilers passes only through the primary washer and the drier, the secondary washer, of the Theisen type, being used for gas going to the gas engines. The primary washer is a cylindrical tank containing a series of wooden baffles arranged in horizontal tiers. The gas enters the bottom at slow velocity and passes through a horizontal tier of vertical baffles, from which it continues upward



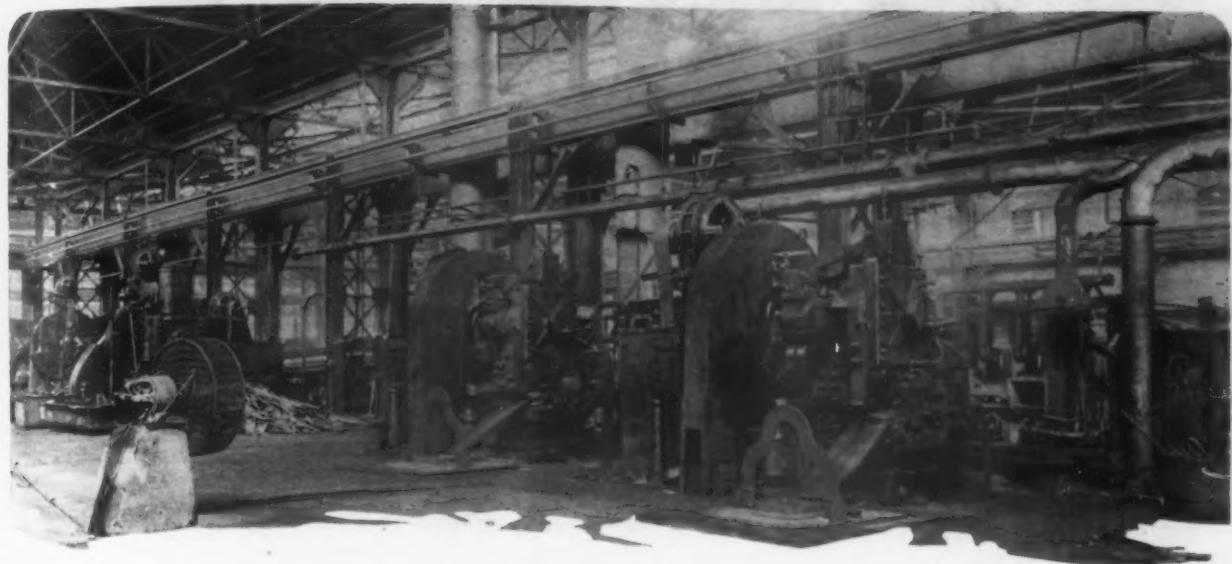
GARY WORKS
of
Indiana Steel Co.



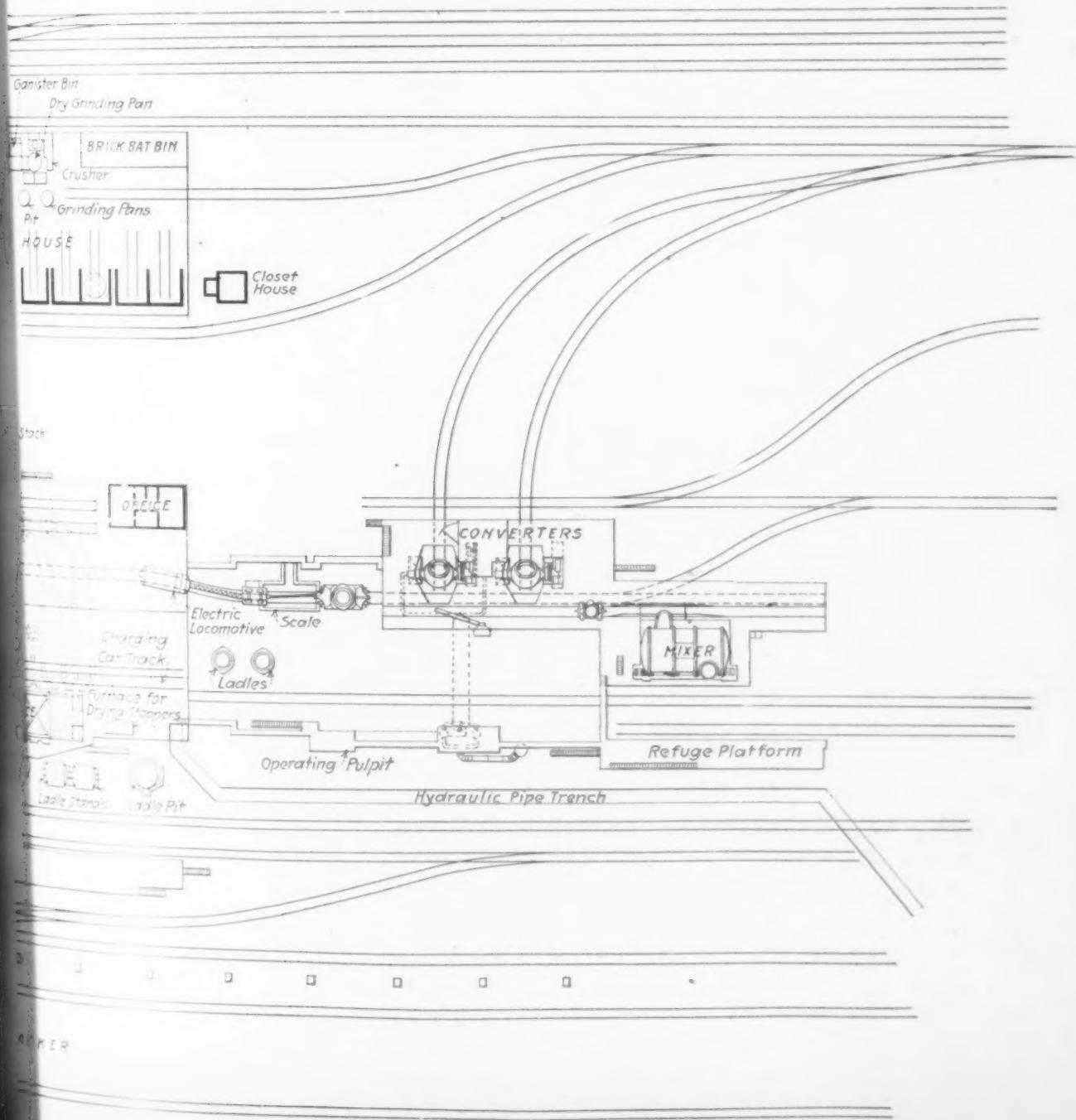
The Tapping Side of the Tilting Furnaces in the Duplex Plant. The furnaces are of large proportions, the dimensions of the hearth being 13 ft. x 46 ft. From eight to nine heats are obtained every 24 hr.



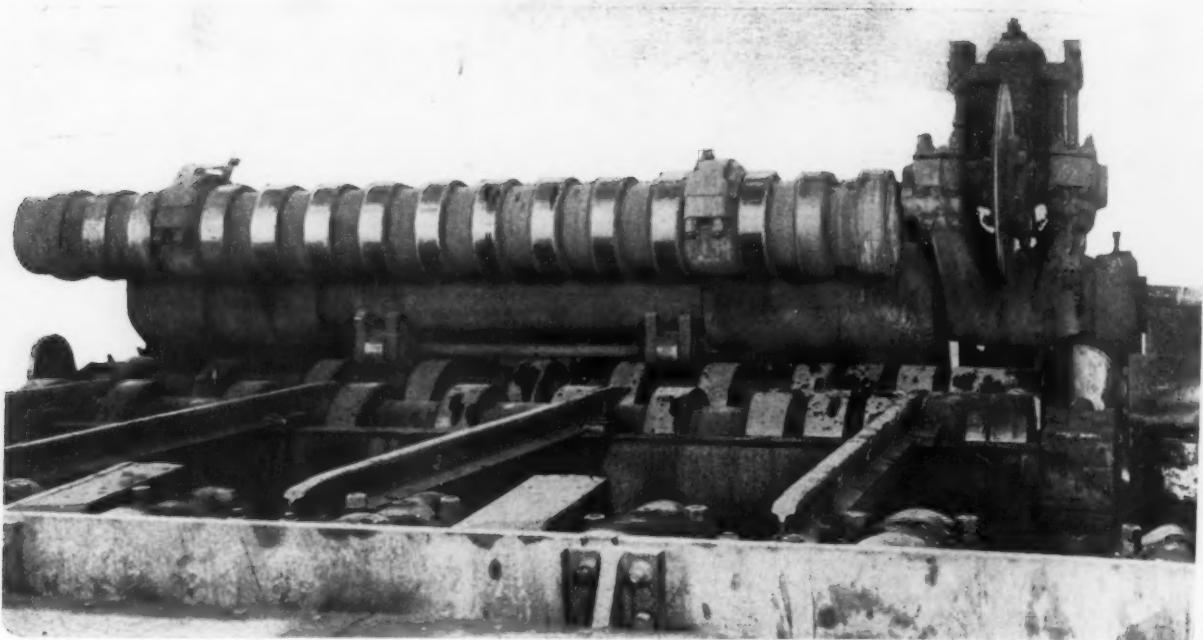
The Duplex Plant Is Equipped with a 1300-Ton Pig Iron Mixer, Two 25-Ton Bessemer Converters and Three Tilting Furnaces. A 100-ton capacity has been provided for the future.



The Two Presses in the Foreground Are Used for Punching and Cutting High Carbon Tie Plates. The end of one of the heating furnaces in which the bars are heated before being punched is visible at the extreme right.



Heating Furnaces of 200 Tons Capacity Each. The open hearths may be heated by coke-oven gas, oil or tar, and space has been provided for producer gas equipment.



The Wheel Blank Cutting Machine Contains Three Long Rolls Between Which a Bloom Is Revolved. A pusher engaging one end of the bloom forces it forward as blanks are cut off by an hydraulically operated disk knife. The thickness of the blanks is regulated by an hydraulic-cylinder extension block situated just beyond the cutting end of the machine.

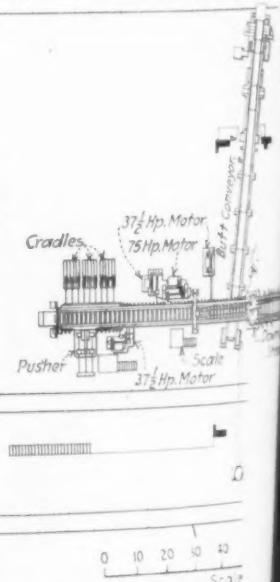
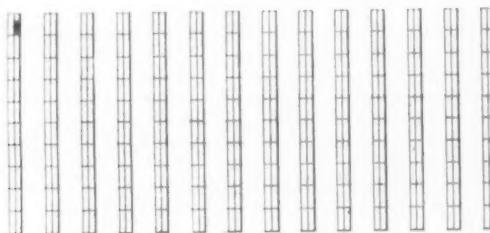
between several cross-pipes with large down-sprays of water, then through another series of vertical baffles, next through umbrella sprays, and finally alternately through several series of bevel and vertical baffles and umbrella sprays. From the washer the gas passes through the drier, which is of sim-

ilar construction except that the tiers of baffles are arranged vertically and the moisture is drawn from the gas instead of being added to it.

improvements in power generating equipment include two 7500-kw. Allis-Chalmers steam turbines which were installed in an older station.

The pumping station of the main works was also expanded, three pumps with individual capacities of 40,000,000 gal. per day, delivered at 30-ft.

YARD CRANE



The 40-in. Blooming Mill Is a Two-High Reversing Mesta Installation Directly Connected to a 4000-hp. Westinghouse Motor

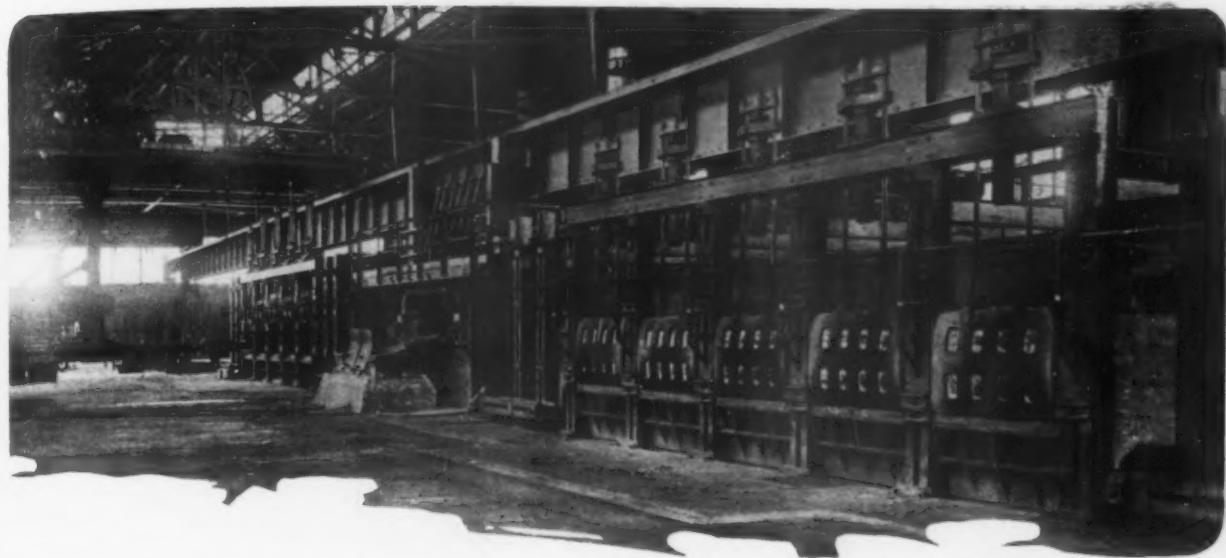
ilar construction except that the tiers of baffles are arranged vertically and the moisture is drawn from the gas instead of being added to it.

The first of the four furnaces was blown in April 14, 1917, and the last, on March 14, 1918. The erection of the blast furnaces necessitated the provision of blowing engine equipment. A new combined blowing engine and power station was therefore erected and seven gas blowing engines and seven gas power engines were installed. These engines, like those in the older stations, were furnished by the Allis-Chalmers Mfg. Co., Milwaukee. A reciprocating steam blowing engine for use as a spare unit in emergency was moved to the station from another house. Power is generated by 3000-kw. Allis-Chalmers dynamos whereas the older stations are equipped with 2000-kw. dynamos. Other

head, having been installed to provide cooling water for the surface condensers for the new 7500-kw. turbo-generators, and two pumps delivering 40,000,000 gal. each at 120-ft. head having been added to increase the general water supply of the plant.

DUPLEX PLANT OF MASSIVE DESIGN

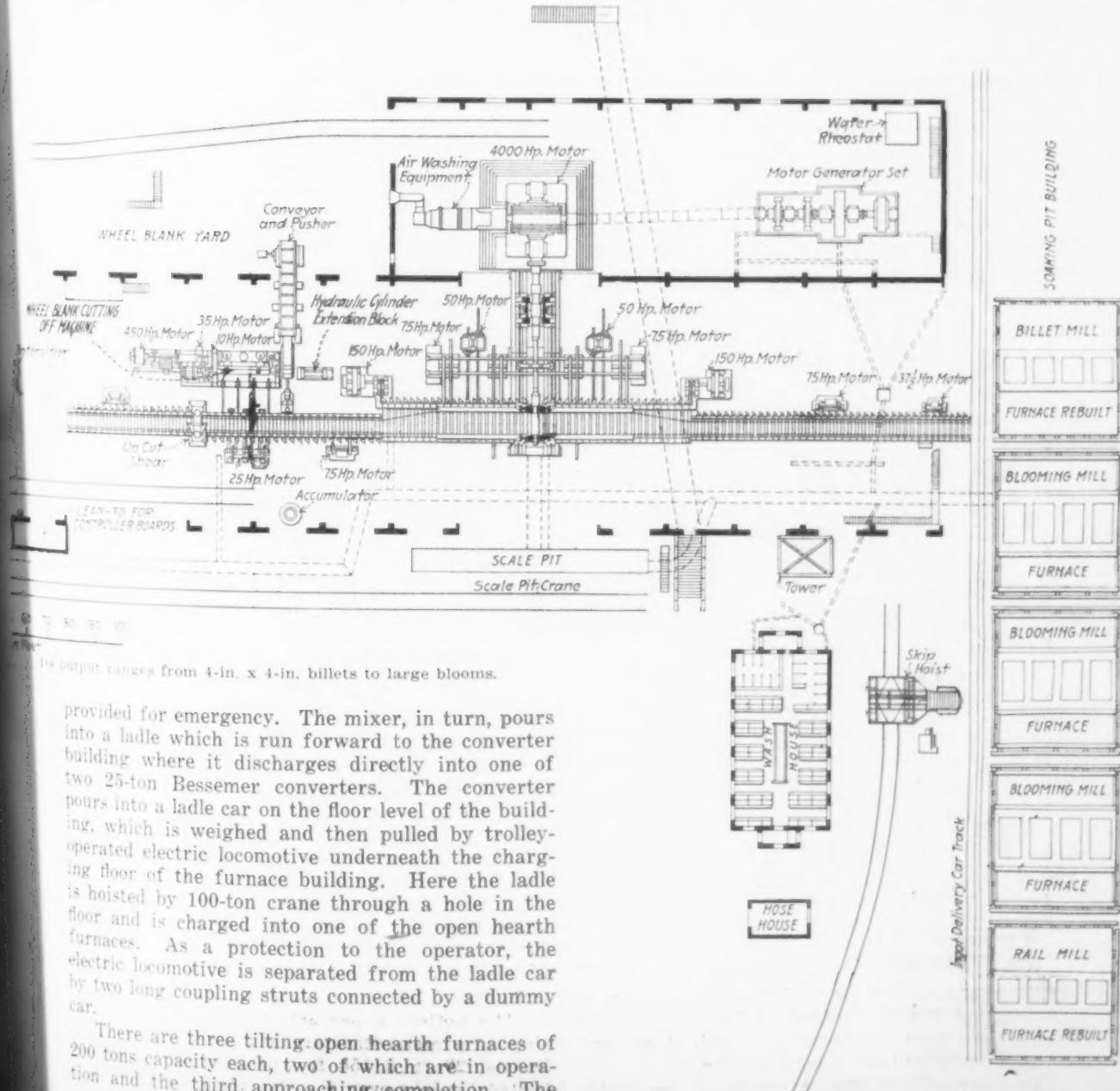
The duplex plant is of massive design, the mixer building at one end being 85 ft. x 100 ft., the converter building 85 ft. x 200 ft., and the furnace building 460 ft. in length, with a width of 72 ft. on the pouring side and 84 ft. on the charging side. Owing to the large size of the open hearth furnaces, the spacing of the center columns is 115 ft., necessarily requiring heavy construction, the crane girders between the charging and pouring bays being 15 ft. in depth.



View in Wheel Plant, Showing the Delivery End of the Continuous Recuperative Preheating Furnace Between the Two Regenerative Type Heating Furnaces. In the background may be seen one of two one-ton Alliance charging cranes.

The pig iron mixer has a capacity of 1300 tons and is set on a high level. The metal is hoisted by a 100-ton Alliance crane to the mixer, which is operated by motor, storage battery power being

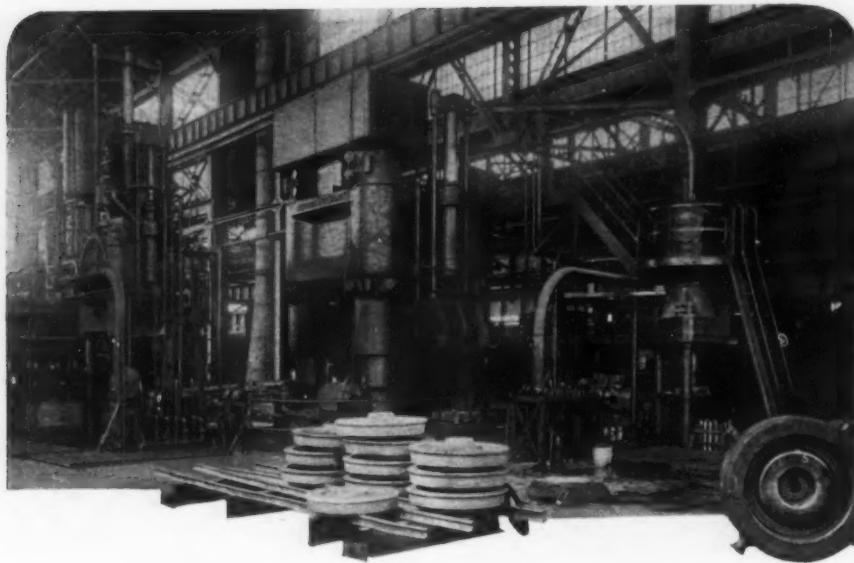
furnaces are of large proportions, the dimensions of the hearth being 13 ft. x 46 ft. They are of the continuous type, from eight to nine heats being obtained every 24 hr. The tilting is accomplished



100 output ranges from 4-in. x 4-in. billets to large blooms.

provided for emergency. The mixer, in turn, pours into a ladle which is run forward to the converter building where it discharges directly into one of two 25-ton Bessemer converters. The converter pours into a ladle car on the floor level of the building, which is weighed and then pulled by trolley-operated electric locomotive underneath the charging floor of the furnace building. Here the ladle is hoisted by 100-ton crane through a hole in the floor and is charged into one of the open hearth furnaces. As a protection to the operator, the electric locomotive is separated from the ladle car by two long coupling struts connected by a dummy car.

There are three tilting open hearth furnaces of 200 tons capacity each, two of which are in operation and the third approaching completion. The



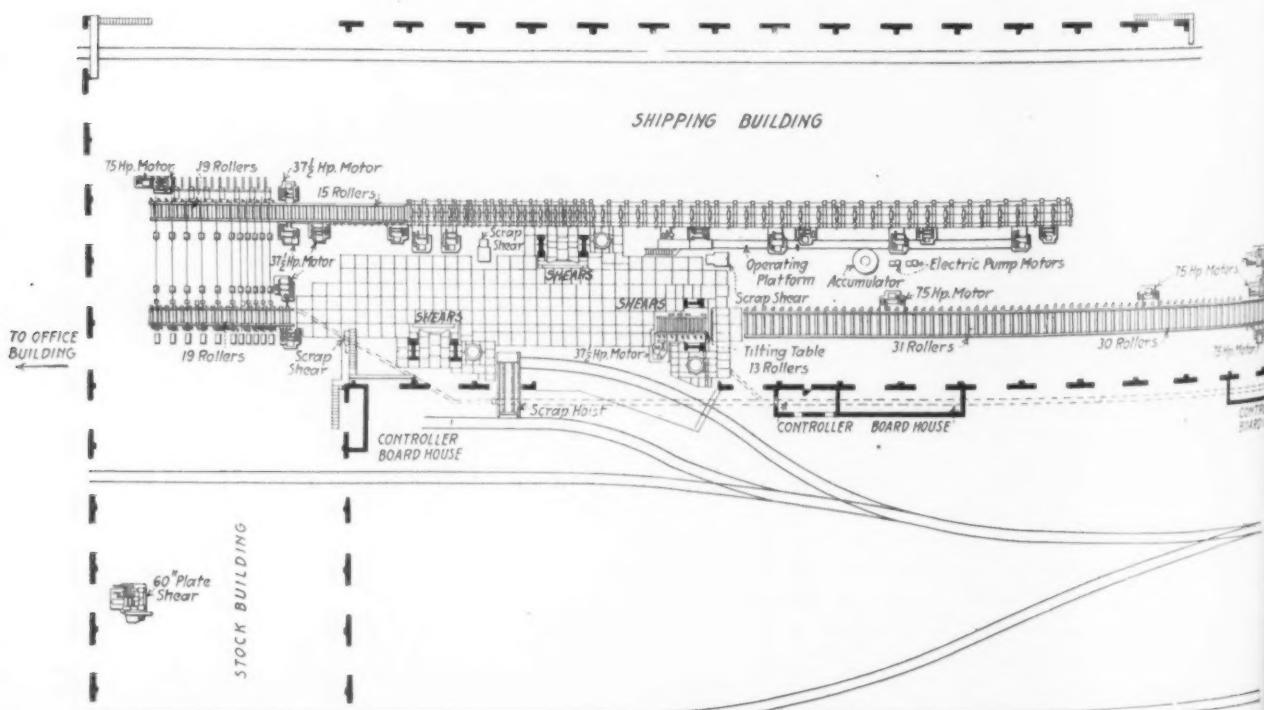
The 10,000-Ton Hydraulic Forming Press in the Wheel Plant Is Equipped with Two Sets of Dies to Insure Greater Rapidity in Handling Blanks. A wheel blank transfer carries the work from the forming press to a 1000-ton hub punching press visible at the left.

by electrical power. Each end of the furnace rests on a reciprocating bed, gear teeth on the cylindrical bottom of the furnace engaging rack teeth on the flat bed. The bed is moved by a worm gear operated by two 37½-hp. motors. Each furnace, therefore, is served by four motors, or two for each bed, the two sets of motors being connected by a stabilizer to insure operation in unison. The doors of the open hearths are hydraulically operated.

The furnaces may be heated by coke-oven gas, oil or tar, and space has been provided for the installation of producer gas equipment. A tar pump house is adjacent to the duplex plant and here cars of tar from the coke plant pass their contents by gravity into two tank reservoirs. The tar is then heated and pumped through a circulating system of the return type which prevents the tar from dead-ending and getting cold and permits the surplus tar not used in the furnaces to return to

ously mentioned, a 100-ton Alliance traveling crane serves the pig iron mixer. In addition, three 100-ton cranes operate on a runway extending through the charging floor to the end of the converter building. On the pouring side of the open hearths two 175-ton Alliance cranes have been provided. Adjacent to the furnaces on the tapping side are twelve 110-ton ladle stands, as well as two ladle repair pits, one at each end of the building. Slag transfer tracks have been provided under the furnaces, so that slag pots can be moved from positions under the slag doors to the pouring side and carried away by crane. The charging floor is equipped with two charging machines for cold charging and for handling the spouts for charging hot metal.

There is not a window pane in the plant, light being furnished by steel shutters. Adjacent to the duplex plant is a wash-house, containing lockers and up-to-date sanitary equipment. This building



The Plate Mill Is a Three-High Mesta Installation Operated by Direct-Connected 7000-hp. Westinghouse Motor. Its total width is 35 ft. x 74 ft.

the pumping unit and be utilized again. When it is desired to use oil instead of tar as fuel, the circulating system is cleaned out with steam and the same pumping unit is used for the oil.

The material handling equipment in the duplex plant is designed for heavy work. As was previ-

is 35 ft. x 74 ft.

The bottom house serving the converters consists of a main structure, 67 ft. x 216 ft., with a lean-to, 20 ft. x 154 ft. It contains eight ovens, heated by coke-oven gas, for baking bottoms, pits for building up bottoms, the necessary raw material

The last forging operation in the Wheel Plant is performed on a 2000-ton hydraulic coning press. From this press wheels are drawn on narrow gage cars by storage battery truck to the storage room.



and brick bat bins, and three machines for grinding and mixing clay.

The rated capacity of the duplex plant, with all three furnaces in operation, is 720,000 tons per year.

The Plate Mill

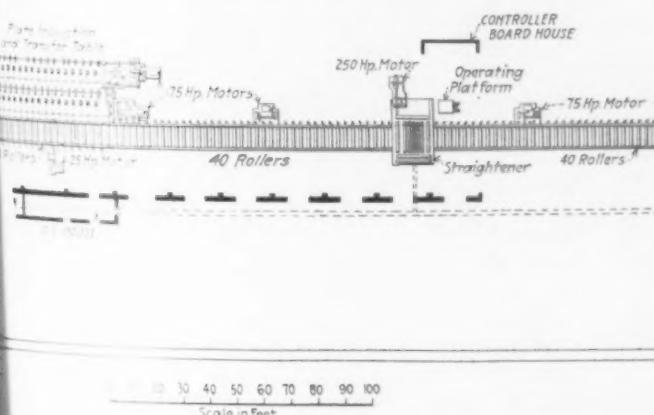
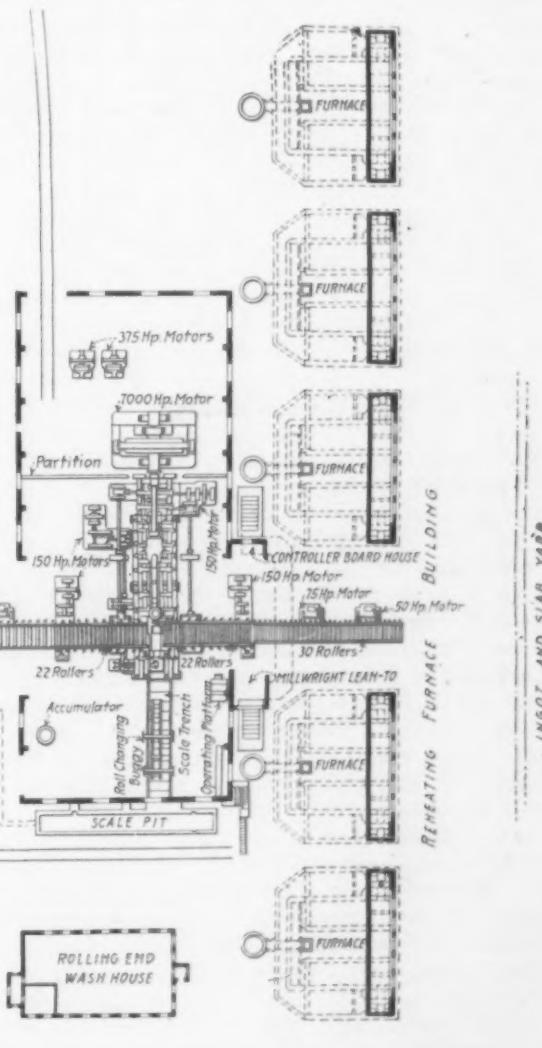
The 160-in. sheared plate mill building is an extensive structure of irregular shape. Five reheating furnaces of the regenerative type, burning coke-oven gas, occupy a space, 125 ft. x 456 ft. The mill building proper is 130 ft. wide at the mill end and 56 ft. in width most of the length. The total length of the building is 894 ft. It is joined at the end by a stock building, 100 ft. x 401 ft., and a shipping building, 85 ft. x 336 ft.

The mill is a three-high Mesta installation operated by a direct-connected 7000-hp. Westinghouse motor. The motor, together with two generators, is housed in a motor room, 85 ft. x 85 ft. Two 150-hp. motors have been provided to tilt the tables on each side of the mill and other motors operate the manipulators, the table rollers, etc.

All of the rolls used in the mill are chilled cast iron. The top and bottom rolls are 44 in. in diameter and the middle roll 28 in., the latter being run

by friction, while the top and bottom rolls are driven by motor. A roll changing buggy operates on a track on the side of the mill opposite the spindle.

After leaving the mill, plates pass through straightening rolls and then to a 160-in. hydraulic



Capacity is 216,000 tons per year.

shear which trims them across the plate, after which they are passed over a castor bed on both sides of which are located hydraulic shears which make the side cuts. From the castor bed the plates are moved to a transfer table, where they are weighed and then conveyed by roller table into the shipping room. In case they are to be piled in stock or trimmed into circular shape, they are lifted by magnet crane from the transfer table and carried into the stock room. Here a standard-type motor-driven 60-in. shear is used for trimming heavy plates, while a motor-driven rotary shear manufactured by the R. S. Newbold & Son Co., is used for light plates. The rated capacity of the mill is 216,000 tons per year.

New Merchant Mills

The new 10-in. merchant mill is situated at the north end of a row of merchant mills, all of which are served by the same billet yard on one side and by a continuous warehouse on the other. The length of the 10-in. mill building from billet yard to warehouse is 735 ft.; its width for a distance of 360 ft. is 96 ft. and for the remaining distance 62 ft. Motor rooms on either side are 41 ft. x 100 ft. and 30 ft. x 125 ft. respectively.

Billets to be reduced by the mill are lowered by overhead crane to a skid bed, from which they pass by gravity to a furnace charging table, containing motor-operated rollers. From there they are fed into a recuperative-type preheating furnace fired by coke-oven gas, or oil. The furnace has an inclined bed and the billets are moved along as they are used by motor-driven pushers situated at the charging end. The billets are discharged from the furnace in their turn by a push bar driven by pinch rollers, and are picked up by pinch rolls on the other side and carried by roller table to six 13-in. continuous two-high stands. The passes are alternately oval and round, so that only three turns of the piece are necessary as against six turns in ordinary practice when alternate oval and diamond passes are used. From the roughing stands the pieces pass through a two-high 12-in. leader stand from which they are delivered to a series of two-high finishing stands. There are two duplicate sets of five finishing stands each, arranged in opposite halves of the building. The leader stand feeds both sides of the finishing department, from which the finished bars pass to a 470-ft. Morgan Construction Co. cooling bed. Pieces may be finished on the stand following the leader pass, namely stand No. 8, or on stands No. 10 and 12, according to the section desired. Stands No. 9 and 11 cannot be used for finishing because of their positions in relation to the repeaters. No hand labor is required in any of the operations of the mill except at the last two stands where catchers are now employed. Even this hand operation is expected to be eliminated through the installation of repeaters.

The six roughing stands and the leader stand are gear-operated from a single 1300-hp. General Electric Co. motor. Stands No. 8, 9, and 10, on both sides of the finishing department, are run by rope drive from two 850-hp. General Electric motors, the rope drive having been installed because it insures smoother operation than gear propulsion. The last two stands on each side are driven by direct-connected motor. When it is desired to change rolls, they are set up in spare housings and are hoisted by overhead crane and placed in the proper locations. Two Alliance 5-ton overhead cranes serve the mill building.

The section of the Morgan cooling bed is an isosceles triangle. The bars are first passed on to a runout table extending the entire length of the

apex of the triangle and then are kicked down notch by notch over a series of racks on either side of the bed until they reach the base where they are deposited on shuffle bars. When enough bars have accumulated at this point, the shuffle bars carry them to roller tables whence they go to shears. After being cut to length they are dropped into a cradle, weighed and carried away by overhead crane. The 10-in. mill has a nominal capacity of 15,000 tons a month.

The 20-in. merchant mill is at the other end of the row of merchant mills and is 156 ft. wide by 735 ft. long, not counting the warehouse which joins it at the finishing end. It is a cross-country mill, containing two recuperative reheating furnaces and nine stands, of which the first three are of continuous roughing type. Unlike the 10-in. mill, it has a flat cooling bed, 180 ft. long. The material is passed by straight edges from the center of the bed outward to the sides and is then passed through straighteners and shears to the back shear table in the distributing building. The rated capacity of the 20-in. mill is 216,000 tons per year.

New Method of Manufacturing Tie Plates

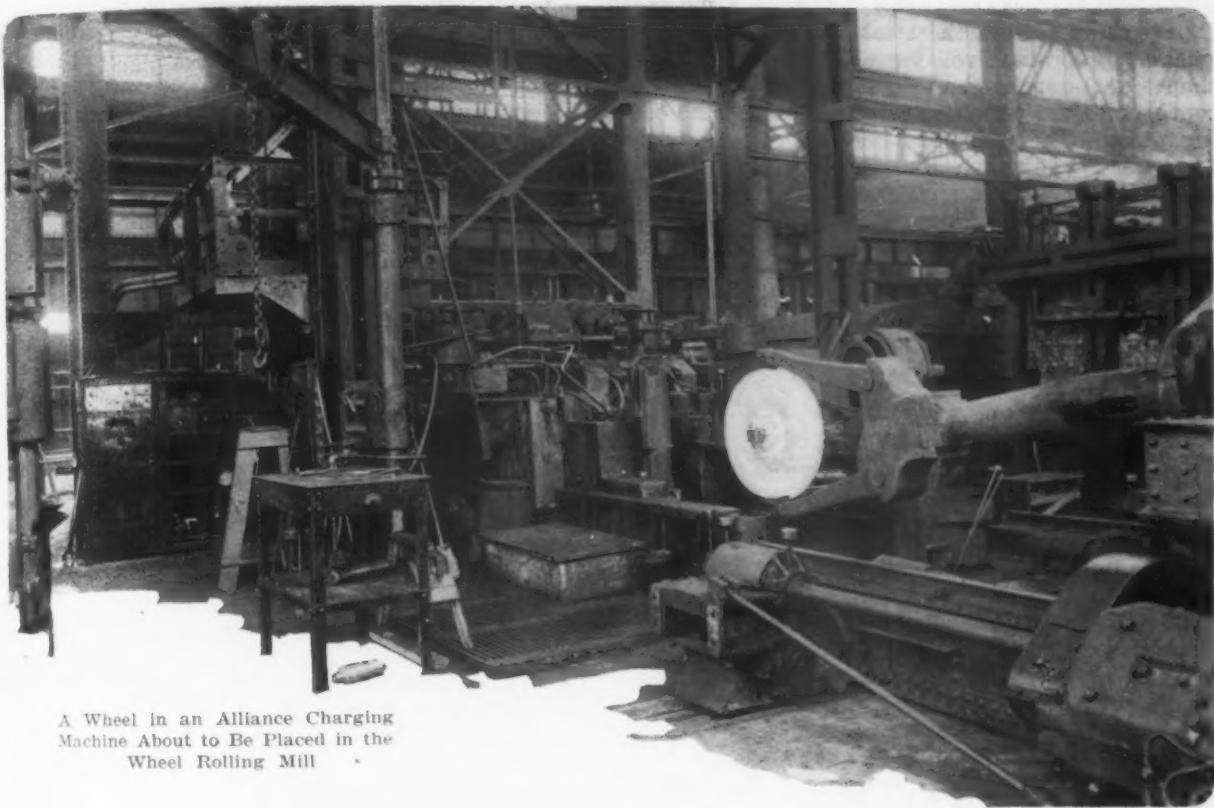
The tie plate plant is located between the 20-in. and 18-in. merchant mill buildings. It is 160 ft. x 300 ft., one-half of the space being used for tie plate bar storage and the other half for punching, bundling and shipping. Tie plate stock is generally rolled on the 18-in. mill, although the 20-in. mill is also suitable for that purpose. Eight punch presses, one of which is a Treadwell and seven Long & Alstatter machines, are used to punch the tie plates and to cut them to length. Six of these machines are used for cold tie plates and two for high carbon tie plates which are punched and cut hot.

Two heating furnaces fired by coke-oven gas are in the stock room. Two bars lying side by side are heated at one time. One of the bars is fed into the press by an automatically operated feeder, while the other is still being heated. After the first bar has passed through the press the second bar is pushed over into its place by hydraulically operated pushers and a third bar is charged into the furnace. The previous operation is then repeated, the second bar being fed through the press while the third bar is being heated. To prevent the punches from sticking to the hot metal and distorting the tie plates, the presses are equipped with strippers. The stripper is operated hydraulically in synchronism with the motor which drives the press and the feeder. Chutes, which have been attached to the delivery side of the presses, carry the finished tie plates by gravity to a drop-bottom bucket which rests in a pit in the floor. When the bucket is filled, it is raised by overhead crane and its contents are dropped on one of two cooling tables where the tie plates are inspected and bundled.

Bundles of tie plates are loaded into buckets, which are lifted from the cooling table by overhead crane and either drop their contents directly into gondola cars or into chutes leading into box car doors. A railroad track running the length of one side of the floor simplifies the handling of shipments. The capacity of the tie plate plant is 10,000 tons of tie plates per month.

New Type of Wheel Blank Cutting Machine

The 40-in. blooming mill and the wheel plant will be treated together, as the former, in addition to producing standard blooms and billets, supplies the wheel blanks which are pressed and rolled into the finished wheels. The blooming mill building proper is 80 ft. x 330 ft. and the motor room adja-



A Wheel in an Alliance Charging Machine About to Be Placed in the Wheel Rolling Mill

cent to it, 56 ft. x 176 ft. The soaking pit building was extended across one end of the blooming mill building, three soaking pits having been added to handle the ingots for the mill.

The blooming mill is a two-high reversing Mesta installation directly connected to a 4000 hp. Westinghouse motor. Steel rolls are used varying in diameter from 37 in. to 44 in. The mill rolls everything from 4-in. x 4-in. billets to large blooms. The bottom roll rotates in a fixed position while the top roll is adjustable. Blooms or billets are conveyed by roller table to hydraulic up-cut shears where they are cut to lengths. Butts are carried away by a conveyor and the billets or blooms are pushed from the delivery table into a cradle, from which they are hoisted by overhead traveling crane and carried to points of storage in the stock yard.

One of the most novel features of the blooming mill building is the wheel blank cutting machine. Ingots are rolled down to 18-in. rounds and then pass along the table to a position adjacent to the cutting machine, where motor-operated fingers located between the table rollers are raised and cause the bloom to roll off the table over a sloping rail bed into the cutting machine. This machine contains three long rolls, the bloom rolling on to the two bottom rolls. The top roll is forced down from above by hydraulic pressure, and the bloom, resting between three points of contact, is straightened. The bloom is then revolved by friction from the motor-operated rolls between which it rests. A friction-pulley operated pusher engaging one end of the bloom forces it forward, while an adjustable, hydraulic-cylinder extension block engages the other end of the piece and regulates the thickness of the wheel blank to be cut off at each operation. The cutting is performed by an hydraulically operated disk knife, which is forced against the bloom and is revolved by friction from the rolling piece. Owing to the tendency of the bloom to push away from the saw during cutting, the faces of the blanks are of slightly spiral shape. As they are cut off, the blanks drop to a motor-operated conveyor and

are delivered into a storage yard where they are pickled and chipped before being shipped to the wheel plant. It is worth noting at this point that there is practically no loss of steel in cutting the blanks.

The wheel plant is roughly 240 ft. x 506 ft., not counting minor irregularities in plan. A 10-ton Alliance overhead crane serves the wheel blank yard, which is on a railroad siding connected with the blooming mill. All of the blanks are 18 in. in diameter and vary only in thickness, according to the weight desired. The blanks are fed into the end of a continuous recuperative preheating furnace containing an inclined bed to permit the blanks to roll to the delivery end. To separate the blanks to be used for different jobs, round billets are inserted as markers. The installation of the preheating furnace in the wheel plant was adopted because high carbon steel is more favorably treated when heated gradually before it is worked.

Two one-ton charging cranes transfer the wheel blanks from the preheating furnace to two side-door heating furnaces of the regenerative type. From the latter the blanks are conveyed by charging crane to a chipping stand where the scale is knocked off. From there they are taken by a motor-operated horizontal swing transfer to a 10,000-ton hydraulic forming press, equipped with two dies on a movable bed to insure greater rapidity in handling material. To illustrate, one die is being pressed while the other die is receiving the next wheel blank and, likewise, the pressed blank is being removed from the first die while the second die is being pressed. Another blank transfer carries the wheel blank from the 10,000-ton press to a 1,000-ton hub punching press, where it receives further work. Two Alliance drawing and charging machines pick up the blanks from the hub punching press, charge them into a reheating furnace, and, similarly, withdraw the reheated blanks and transfer them to the wheel rolling machine.

Here a mandrel and nut are fitted into the bore of the wheel blank, which is then pushed up a run-

way into a carriage between the rolls, part of which merely serve to hold the blank in position, and the remainder of which roll the edges into the desired shape. After rolling, the blank passes by gravity conveyor to the web hole punch press and the coning press. The web punching press is a 600-ton hydraulic machine and is used only when web holes are specified. In many cases the wheels pass directly from the rolling mill to the coning press, which is a 2000-ton hydraulic machine. From the last press the wheels are drawn on narrow gage cars by a storage battery locomotive to the wheel storage room, where an overhead crane carries the wheels to a crushed slag cooling floor. After cooling, the wheels are rolled by hand into storage where they remain until they are ready for machining.

Reverting back to the forge department of the plant, the presses are served by four 2500-lb. pressure hydraulic pumps operated by four 650-hp. motors, a 2500-lb. pressure accumulator and a 5000-lb. pressure intensifier. Both the presses and the pumps, as well as the wheel rolling machine, were built by the Bethlehem Steel Co. The motors were supplied by the Allis-Chalmers Mfg. Co., Milwaukee. A smaller accumulator and three plunger pumps operate the doors on the various furnaces at 500-lb. pressure.

In the machine shop are four rows of machine tools used for boring and facing the hubs and turning the tires. There are two double wheel lathes, one a Putnam and one a Niles, ten extra-heavy Betts car wheel borers and seven 66-in. Betts standard steel tire mills. The machines are of massive design, the car wheel borer weighing 44,000 lb. and the tire mill 42,000 lb. The machines are motor-driven and are served by two 15-ton Alliance overhead cranes. There are additional miscellaneous tools in the shop which are used in machining dies and for general repair work.

The finished wheels are rolled by hand from the machine shop to the inspecting and shipping department. This is a spacious room, 90 ft. x 240 ft. and is very well lighted, the roof eaves being 40 ft. above the floor and continuous sash being provided in three walls and in the monitor above. The floor throughout the inspection room and the machine shop, except for the concrete foundations of the machine tools, is of wood block and heavy planking. These materials are well adapted to the rolling of wheels and prevent their being chipped or damaged if they fall to the floor. In the inspection department the wheels are sorted in pairs, marked and weighed, and rolled into railroad equipment, which is switched in on a track running the length of the

room. This department is also served by a 10-ton Alliance overhead crane.

The rated capacity of the wheel plant is 20,000 wheels per month. The plan of the works is such that it may be extended without impairing the relation of the various units to each other or necessitating any change in the present scheme of routing work through the plant.

DeLamater-Ericsson Memorial Tablets

At the annual convention of the American Society of Mechanical Engineers last December, a memorial meeting was held on the evening of Dec. 3 in commemoration of the eightieth anniversary of the arrival in the United States of Captain John Ericsson and his fifty years' association with Cornelius H. DeLamater in engineering work. In advance of the meeting it had been decided to erect memorial tablets to mark the sites of certain buildings which were closely identified with the work of DeLamater and Ericsson. It was proposed to erect four tablets as follows: One at the Phoenix Foundry at Laight and West streets, New York, where the first screw-propelled vessel in this country and the first steam fire engine were constructed and where many other original developments were made; one at Captain Ericsson's residence, 26 Beach Street, New York, where he designed the Monitor and made all his inventions during his later years; one at the DeLamater Iron Works at the foot of West Thirteenth Street, where the engines of the monitors Puritan and Dictator were built, and one at the Continental Iron Works, Greenpoint, L. I., where the hulls of the Monitor and other warships were built.

Those who would care to contribute to the tablet fund, especially to commemorate the invention of the screw propeller and the building of the Monitor, are requested to communicate with the DeLamater-Ericsson Tablet Committee, H. F. J. Porter, chairman, Room 1100, Engineering Societies Building, 29 West Thirty-ninth Street, New York.

The James H. Herron Co., consulting engineer, Cleveland, announces that the firm of Hool & Johnson have become associated with it and new offices have been opened in New York and Milwaukee. Hool & Johnson are George A. Hool, professor of structural engineering at the University of Wisconsin, and Nathan C. Johnson, who has been in consulting practice for several years in New York, specializing in the technic of concrete manufacture. They have also been associated in the authorship of text books on concrete and have another book on building construction now on the press. The company occupies a building at West Third Street and St. Clair Avenue, Cleveland, using 18,000 sq. ft. of floor space, in which are located chemical and physical laboratories, machine shop, pattern shop, drawing room, etc.



The Wheel Inspection Room Is a Spacious and Well Lighted Bay. After being inspected, sorted in pairs, marked and weighed, the wheels are loaded directly into railroad equipment. Cars may be noted at the left

Ferromanganese Practice in Great Britain

Furnace Design and Ores Used—Cost of Production—Post-War Situation and American Market—British and American Competition

—BY PAUL M. TYLER*

In spite of the secrecy surrounding the manufacture of ferromanganese in Great Britain, the practice in that country appears to be little if any different from that on the Continent and it is common knowledge that no marked improvements have been made in the last 25 years. The success of the British smelters can be largely attributed to their long experience in the business and the individual skill and training of the furnace men. The furnace operations are governed chiefly by rule of thumb. Fair recoveries are made, but this is at the expense of rapid driving.

Blast Furnaces Used Exclusively

The entire output is supplied by six producers, all of whom employ blast furnaces. On account of the high cost of power, ferromanganese could not be produced on a commercial basis in electric furnaces in the British Isles.[†] The furnaces are similar to those employed for making pig iron and are alternatively used for that purpose as well as for the manufacture of spiegeleisen. Frequently a furnace is blown in on spiegeleisen and switched to ferromanganese as soon as it gets into normal running. When the lining becomes badly worn, the furnace may again be put on spiegeleisen and later, when the lining has become still thinner, pig iron may be made for a few weeks before blowing out and relining. During the last two or three years, owing to the difficulty in securing manganese ore, furnaces have been run for weeks on mixtures of manganese ores and manganiferous iron ores, making spiegeleisen as a main product although under normal conditions the production of spiegeleisen is incidental since it is not in great demand by English steel makers.

The blast furnaces used by the ferromanganese companies are larger and better equipped than the average British furnaces, ranging from 70 to 80 ft. high and being rated at from 1000 to 1500 tons of pig iron per week. When running on ferromanganese, however, the capacity is reduced to between 400 and 520 tons per week, or only a trifle more than one-third the normal rating. If the extra time lost in repairs and relining is considered the reduction in output is even greater.

Furnace Design

There is apparently no uniformity in the design of the furnaces and the operators claim that any furnace that will make pig iron can be used for making ferromanganese, provided extra care is taken in lining. Less emphasis seems to be laid upon the stove capacity than is given in the United States, but this may perhaps be explained by the lower rate of driving. The dimensions of

one furnace used in making ferromanganese are as follows:

	Feet
Height (hearth level to charging platform)	70.0
Diameter of bell	10.0
Diameter of stock line (throat)	15.5
Inside diameter of bosh	18.0
Inside diameter of shell (at bosh line)	28.25
Diameter of well	10.0
Depth of well	6.25

An unusual feature of the design is the contraction from the bosh to the hearth which, instead of being a straight line, comes down on a curve of 26-ft. radius. As indicated by the above figures, the thickness of the lining at the bosh line is 5 ft. No water-cooling blocks are used.

There are eight 6-in. tuyeres. The blast pressure varies from 6 to 7½ lb. per sq. in. and the average temperature of the blast is about 1000 deg. Fahr. As compared with pig iron practice in England, the blast pressure is that commonly employed on a furnace of this height while the temperature ranges between 200 and 300 deg. higher. The ore averages about 40 per cent coarse (fist size), 30 per cent "rubble" (say ¼ in. and over), and 30 per cent fines.

The average output from the above furnace is 400 tons per week of 77 to 78 per cent ferromanganese. The usual charge is Indian ore, 55 cwt.; dolomite, 19.5 cwt.; and coke, 67.5 cwt. The coke consumption, on the basis of these data and probable recoveries, may be taken at 2 tons, 7 cwt. (5264 lb.) per ton of ferromanganese. The amount of slag produced per ton of ferromanganese figures out between 1.5 and 2 tons. The average manganese content of the slag is given as 10 per cent. No data are available to show the amount of manganese lost in the flue dust.

Coke Consumption

The coke consumption in various British ferromanganese plants is said to range from 2 tons, 5 cwt. (5040 lb.) to 2 tons, 15 cwt. (6160 lb.) per ton of alloy. It is stated positively that at no furnace in the United Kingdom is the coke consumption down to two tons (4480 lb.) in making ferromanganese although pig iron is made in the same furnaces using only 20 to 21 cwt. (2240 to 2352 lb.) of coke per ton of pig iron with 36 per cent iron on the burden.

The slags are kept rather basic in order to increase the temperature and eliminate sulphur and phosphorus. It is difficult to obtain any average slag analyses covering British practice, but the high lime factor is clearly shown by observation of the dumps which disintegrate very rapidly upon exposure to the weather. The manganese content of the slag will range from a minimum of perhaps 7 per cent to 15 per cent or more, depending upon the conditions in the furnace. The average content may be taken at between 10 and 12 per cent manganese. These slags, however, are generally sold to foundry iron makers or used alternatively with manganiferous iron ores to bring up the manganese content of pig iron.

The following table gives comparative slag

*Metallurgical expert, United States Tariff Commission.
†Power costs in the United Kingdom average approximately 11½d per kilowatt-hour and probably the lowest rate is over 8d. The projected hydroelectric developments in Scotland may generate at a cost of 0.15d at the plant but the locations are not favorable for the economical transport of ore or product and the power cannot be transmitted to the industrial sections to compete with steam generated power in those areas.

analyses for a German furnace described by Jakobi* and for a recent run in a British plant, sulphur being calculated as CaS:

	German, Per Cent	British, Per Cent
SiO ₂	30.32	32.7
FeO	1.41	0.9
Al ₂ O ₃	10.88	7.5
CaO	41.34	29.5
MgO	2.96	13.0
MnO	8.52	13.0
CaS	3.94	3.4
P ₂ O ₅	0.01	...
BaO	0.48	...

It will be noted that on account of local conditions dolomite was used as flux in the British furnace. The alumina content is lower than that of the slags ordinarily made and is close to the minimum for proper working of the furnace. Ten per cent is probably a more common figure. According to Jakobi, the German figures are for a typical blast furnace run; the coke consumption was 2.37 tons per ton of ferromanganese (which compares favorably with the best British practice) and, of the total manganese charged, 76.9 per cent was recovered in the product, 6.7 per cent was accounted for in the slag, and 16.4 was "volatilized" or lost in the flue dust.

The Ores Used

Practically all the ore that has been available in England since 1914 has come from India. The yield from this ore, which averages at present a trifle more than 50 per cent manganese, is between 50 and 52 tons of ferromanganese per 100 tons of ore charged. The product averages 77 per cent manganese, so the recovery may be taken at nearly 80 per cent of the manganese contents (neglecting the ultimate recovery of the manganese in the slag when remelted in pig iron furnaces). Prior to the war, British makers used considerable quantities of Caucasian ore, either alone or mixed with Indian ore. They were then able to make ferromanganese containing from 78 to 82 per cent manganese and averaging 80 per cent. Owing to the somewhat higher iron contents of the Indian ores, British manufacturers have had to lower their standards to 76 to 78 per cent, the latter being the absolute upper limit that they can obtain from Indian ore without the admixture of other ore that will raise the manganese-iron ratio.

The Indian ores delivered in Great Britain during the past year have averaged probably about 51 per cent manganese and 6 per cent iron, a ratio of 8.5 to 1. If the recovery of manganese be taken at 80 per cent and that of iron at 100 per cent (due to iron contents of coke and flux), it would appear possible to make an alloy containing 80 per cent Mn, 13 per cent Fe, and 7 per cent carbon and other impurities. This does not work out in practice, however, indicating an appreciable amount of iron in the fluxes and ash from the large quantities of coke required. While the Caucasian ore generally does not carry any larger percentage of manganese, its manganese-iron ratio is considerably higher than that of Indian ore, frequently as much as 30 to 1.

Cost of Production

Detailed costs of producing ferromanganese in the United Kingdom have not been obtained, but sufficient data are available to make a fairly close estimate of the cost of making the alloy in British works. Since the cost of ore and fuel delivered at the furnace constitutes over 80 per cent of the total cost of production, slight errors in

estimates of costs of running the furnace will not introduce differences in excess of the normal fluctuations in the market quotations for the ore.

Next to raw materials, labor is the most important item. In spite of the somewhat lower wages paid in Great Britain, the labor cost is apparently larger there than in American plants owing to differences in mechanical equipment. The labor cost of pig iron made in the United Kingdom in 1919 ranged from 16s. to 33s. per ton. Since the furnaces operated by the ferromanganese makers are better designed and more efficient than the average British furnace, a fair estimate of the present labor cost for these furnaces is 20s. per ton of pig iron and certainly not over 40s. per ton of ferromanganese. Fewer data are available for estimating the cost of relining and repairs, but these items are probably a little less than they would be in the United States owing to slower driving and lower wages. Refractories can be taken at a trifle under the cost at American works.

Based on the above assumptions and figuring exchange at £1—\$4.00, the following cost sheet may be made out:

<i>Cost of Producing Ferromanganese (77 Per Cent) at British Works in July, 1920.</i>	
Two tons of ore (50 per cent) at 4s per unit.	\$0.00
Freight and handling on ore.	4.00
Two and one-half tons coke at 65s (delivered)	32.50
One ton limestone at 15s.	3.00
Direct labor at 40s.	8.00
Relining and repairs.	5.00
Other charges	5.00
Total	\$137.50

When it is considered that ferromanganese was quoted at £35 (\$140) for home consumption, it would not appear that British makers were making any large profit, but it must be remembered that most of them had secured their ore at 3s. 6d. and that export prices, ranging from £5 to £10 higher, permitted narrow margins on home deliveries.

As compared with pre-war costs, the above figures represent varying advances, all of which are considerably in excess of 100 per cent. A little British ferromanganese was offered in the United States at \$35 before the war, and it seems probable that in 1913 and 1914, ferromanganese was being made at several British works for as little as \$30 per ton. The chief increase has been, of course, in the price of manganese ore, which was selling in London in 1914 as low as 9d. per unit and may have been obtained even more cheaply by the companies that had direct connections in India and the Caucasus. Fuel has increased by fully 200 per cent, good coke being obtainable in 1914 at 18s. or less. Wages at the furnace have increased by from 125 to 175 per cent, the average being about 150 per cent for all classes of blast furnace employees. There are now practically no workers about the furnaces that do not receive at least £1 per day of 8 hr. and the average is slightly higher.

Post-War Situation

Following the cessation of hostilities, British ferromanganese makers made active efforts to re-establish themselves in the American market which they had been forced to largely neglect during the war, owing to home requirements and restricted ore supplies. With the assistance of the Ministry of Munitions, they had been able to continue operations and, when the armistice was signed, there was a considerable surplus of ore and some ferromanganese on hand, sufficient to meet the estimated requirements under the war program for six months. Early in 1919, the needs

*Ferromangan im Hochofen, Stahl und Eisen, Vol. 29, 1909, p. 1119.

of British steel works were greatly reduced and British ferromanganese was available in large amounts for shipment to the United States. The price in England dropped to under £25 per ton and at least one shipment was made to the United States on the basis of \$95 per ton, c. i. f.

In the summer and early fall of 1919, Indian ore was obtainable at 2s. 6d. per unit and British ferromanganese was freely offered in the United States at around \$100 per ton, which included the freight of 20s. and other shipping charges. Many of the high-cost American producers who had entered the field during the war were unable to meet this price and were forced to shut down. While the British producers were successful in placing orders for their product, they did not cover their ore requirements, evidently expecting a continued drop in ore prices.

Instead of the difficulty of securing ore becoming less, it increased during the reconstruction period. Heavy shipments of jute and seeds from India had the effect of raising the freight rates on manganese ore and changes in the design of the vessels made it unnecessary for many of the steamers to carry any large amount of heavy ballast. Under after-war conditions, the average amount of manganese ore carried on the liners is only from 1000 to 2000 tons and the former quantity is ample ballast for most of the newer boats. Cargo space, therefore, instead of being easier to get, became almost impossible to secure. Ore prices increased slightly at Calcutta and Bombay, but the dominant factor was the ocean freight, which increased from 65s. in late October to 85s. or more in December. Even more was paid for prompt shipments by tramp vessels which were securing 115s. and more per measurement ton of jute and demanding practically the same rates for ore by weight, although the latter takes up only 18 cu. ft. of cargo space.

British smelters were offered the ore at 3s. and again at 3s. 3d., but they refused to cover their future requirements at these figures. Toward the end of the year, they were forced to buy at over 3s. per unit but were unable to cover their immediate needs. In January, 1920, ferromanganese was quoted at £30 per ton but the price was nominal and practically none could be had except under contract for £33 and even £36. The British smelters were straining their efforts to maintain deliveries on their American contracts and were turning down offers from Germany and other European countries with the hope of retaining their grip on the American market.

With the improvement in the British steel output, the shortage of ferromanganese became acute. Differentials were again established between home and foreign account and one of the large steel companies absorbed the independent ferromanganese concern with the avowed object of guaranteeing its requirements of the alloy. In spite of increased prices, the British makers were unable to keep pace with the demands or even maintain their output. They were still unable to secure any Caucasian ore and Indian supplies which were limited by the carrying capacity of the railroads was divided with American ore buyers.

British and American Competition

The natural result has been the expansion in the American output during the second quarter of 1920 and following the rapid increase in prices that took place in April. American producers were actually in a better position to secure manga-

nese ore than the British smelters. Indian ore can be delivered in New York as cheaply as in Liverpool and the United States can also draw upon Brazil and other Latin American countries for supplies more advantageously than Great Britain. Ore prices in this country have been high but now average practically the same as in England and deliveries are undoubtedly better.

While in early 1919 it seemed impossible that the American ferromanganese industry would be able to maintain itself against British competition, this now seems an established fact. American smelters have gained experience in running their furnaces and by the time foreign competition again develops should be in a position to operate as efficiently as makers in either England or Germany. Their fuel costs, assuming normal transport conditions, will be definitely lower than those abroad. The vital factor of ore supply is the one point that is in doubt. The abnormally cheap freight on Indian ore carried to Europe as ballast, which constituted the chief element in the dependence of the United States upon foreign ferromanganese, is no longer a factor now that India has become a large exporting country. There is no indication that imperial preference will be invoked, so it would appear that American and British firms will be on equal terms in securing manganese supplies from that source.

The extent of British competition in the future would seem to hinge upon the situation in the Caucasus and the adjustment of shipping rates from Black Sea ports. Prior to the war British producers had the advantage in that region, operating their own mines and enjoying low freight rates. Reports as to conditions in the Georgian Republic at present are contradictory and the trade routes to that part of the world are not yet established.

New Heat Treating Service Laboratory

The New England Metallurgical Corporation, 199 Washington Street, Boston, metallurgical service, incorporated under Massachusetts laws some four months ago, is constructing in South Boston a one-story, 50 x 100 ft. plant, where annealing, case-hardening and heat-treating operations will be carried on, beginning about Jan. 1. The equipment of this plant will include one car bottom furnace, 25 ft. x 13 ft. x 8 ft.; another, 10 ft. x 9 ft. x 10 ft.; two general heat-treating furnaces, 27 in. x 56 in. x 14 in.; two others, 36 in. x 61 in. x 14 in., and several smaller furnaces for high-speed tool steel work, in addition to water-cooled oil and water tanks, oil tempering and oil baths, portable forges, a straightening machine and a miscellaneous lot of machine tools. The furnaces are of the surface combustion type and will be charged with gas. Most of the equipment has been purchased. W. B. Byers, who during the war was assistant metallurgist at the Watertown Arsenal, Watertown, Mass., is president of the company, and W. L. Williams, treasurer.

The interests of the Colby Steel & Engineering Co., Seattle, which in 1918 purchased the steel fabricating plant of the West Coast Steel Works and also the plant of the Auto Marine Engine Works, both at Tacoma, Wash., have been consolidated with the interests of the Star Iron Works, Tacoma, the name of the new company being the Star-Colby Mfg. Co. The company now has facilities for the manufacture of cranes of all types, monorail systems, structural steel fabrication, forgings, road graders, dock and warehouse trailers and trucks. C. M. Hansen is president and general manager of the new company, R. N. Allen, secretary, and Lindsay N. B. Campbell is superintendent of the structural department.

Sheet, Pair and Annealing Furnaces—I

Types Used in the Manufacture of Sheet and Tin Plate—Details of a Stoker-Fired Tandem Combination Furnace

BY C. F. POPPLETON

IN the rolling of black sheets perhaps the most important single operation is the heating of the sheet bars. These must be brought up to the rolling temperature with a slow, even rise. A sudden heating scales the bars, and this scale is very liable to be rolled into the pack, spoiling the sheet.

The function of heating furnaces is to bring the cold bars up to the necessary temperature for rolling. The first or roughing process through the rolls must of necessity decrease the sectional area of the bar, necessarily increasing the longitudinal dimension in direct ratio. When the two bars are placed one upon the other and rolled to the limit of the heat retained they are embryo sheets; but as the heat has been dissipated they require reheating before they can be brought down to the requisite gage. In fact, it is almost impossible to roll sheets to the thickness required without doubling.

The older type furnaces consist of a heating chamber with a flat hearth and a firebox. At that period of the history of the manufacture little or no consideration was given to economy in fuel or to the comfort of men. So fuel naturally was wasted, the products

of combustion being run from the grate bars over the bridge wall and direct to the stack, which was usually placed at the front end of the furnace and in the crown of the arch. In fact, in quite recent years the writer has seen green coal burnt directly on the hearth itself, a practice now obsolete, being dirty and almost impossible of regulation so that uniformity of product was very difficult to obtain.

Innovations Not Welcomed

The palpable defects were soon apparent and better designed furnaces made their appearance. But it must always be borne in mind that the workers in the tin plate and sheet industry were particularly conservative; in fact, carried this conservatism to such an extent that it was almost impossible to get a fair trial for any innovation. No matter how meritorious it was on the surface, it always met with strenuous opposition.

The heaters, rollers, and in fact the whole crew of the mill, took the stand that the art was secret and that workers only acquired it by starting in as boys and working their way through the various processes until they became in turn bosses. The system was to

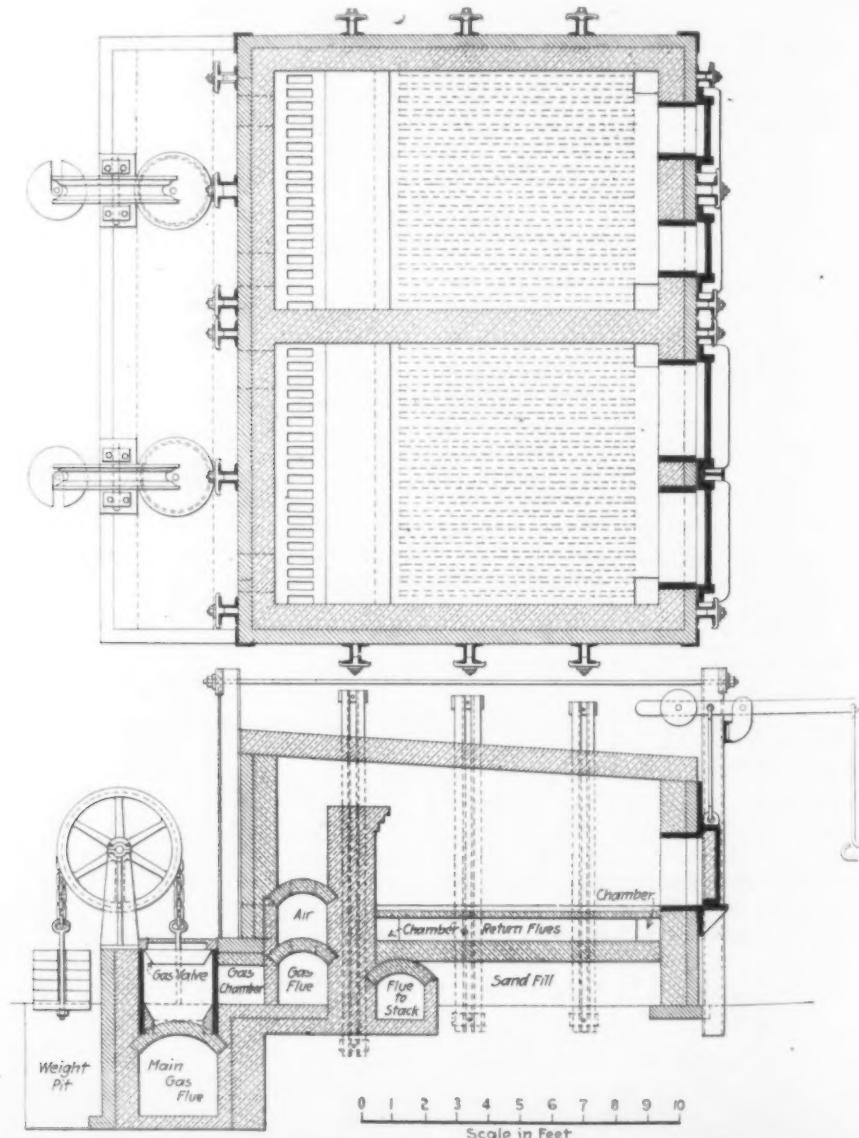


Fig. 1.—Sheet and Pair Furnaces Originally Designed for the Use of Producer Gas and Later Changed to Be Stoker-Fired
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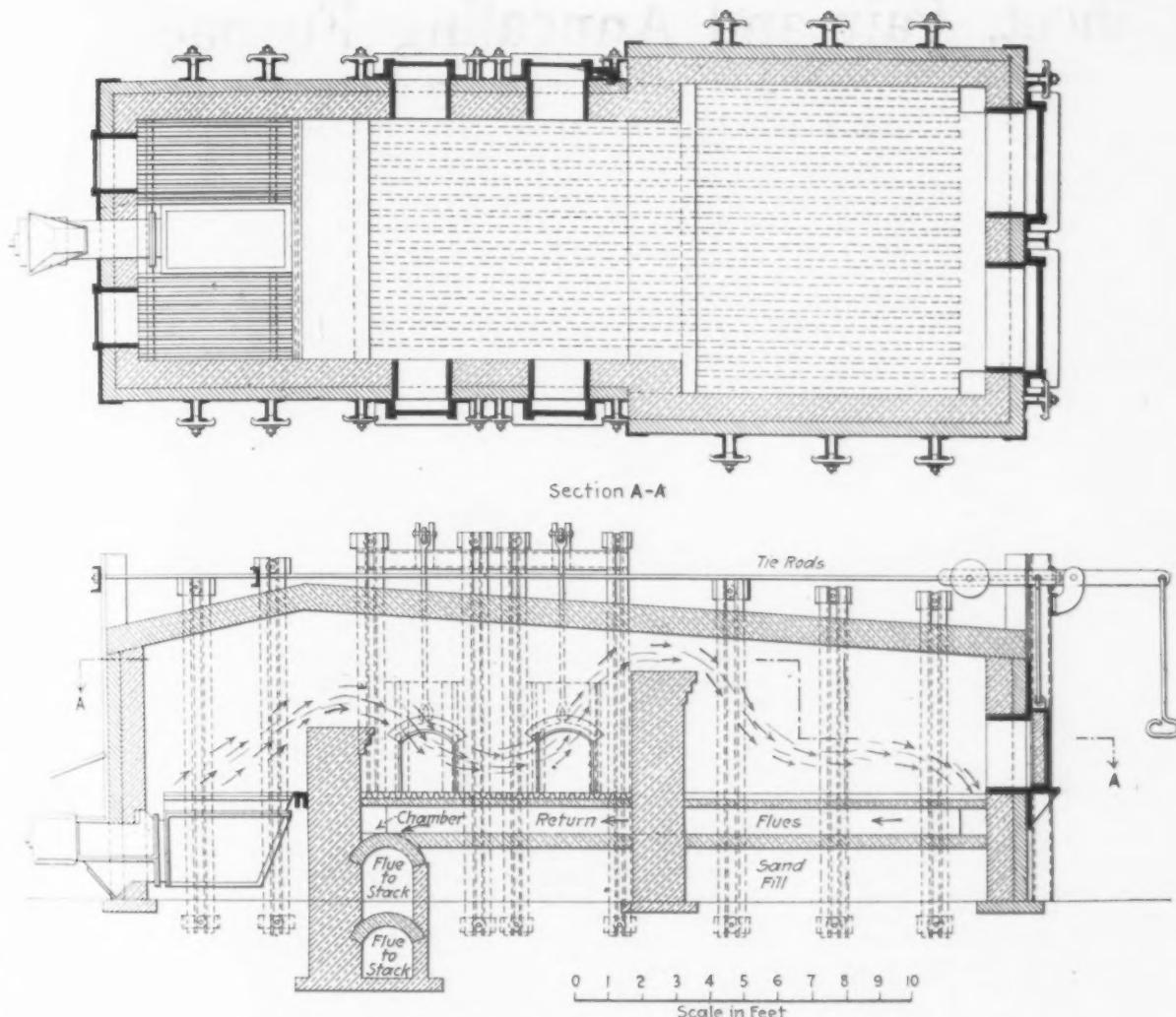


Fig. 2.—Stoker-Fired Tandem Combination Furnace

pay the bosses on a tonnage basis and the bosses paid the crews.

The direct draft pull of the stack situated in the crown of the arch was, of course, the most wasteful method of trying to utilize the products of combustion. The next move was to build side flues. The outlet still remained in the crown of the arch, but the flame was taken under the hearth at the front for a short distance and thence by side flues to the stack. This minor improvement enabled a greater percentage of the B.t.u. value of the fuel to be used, owing to the gases having to seek the hearth at the front end of the furnace for an outlet.

The next advance was to carry the products of combustion back under the hearth to the bridge wall and thence lead them by underground flue to a stack. It is of vital importance that each individual hearth should have means of separate regulation and this can readily be accomplished by means of dampers in the underground flues; and another advantage appears—that it is not absolutely necessary to have individual stacks for each hearth.

These furnaces were the older type and were built side by side facing the roll train. A minor economy was also effected by arranging the sheet and pair furnaces (still side by side) with two arches and a common dividing wall. This saved one wall and two sets of buckstays, and also saved about 3 ft. in longitudinal space in the mill building crane runways, etc., for each pair of furnaces.

Sheet and Pair Furnaces for Producer Gas

Fig. 1 shows typical sheet and pair furnaces side by side, as designed by the author for a Pittsburgh district tin plate plant in 1909. These furnaces were designed for the use of producer gas, which is not an economical fuel for sheet and pair furnaces. After they had been used on producer gas for about a year the

work back of the bridge wall was torn out and type H underfeed stokers, provided by the Combustion Engineering Co., were substituted. These furnaces are still in use and giving satisfactory service.

The hearths of both the sheet and pair furnaces are flat and are covered with special corrugated tile. The latter fill several useful purposes. The corrugations enable the flame to pass under the sheets or pairs, render it easier for the heater to get his tongs under them, and a receptacle is formed for scale which is easily blown out by means of a compressed air hose. Pockets are provided at the rear of the hearths which communicate with a scale flue, accessible from the outside of the furnace.

The combustion air is introduced by means of an air flue immediately above the gas flue, which has 9-in. x 3-in. ports in the crown. Similar 9-in. x 3-in. ports are arranged in the crown of the air flue and combustion takes place immediately the gas and the air are mixed behind the bridge wall. At each end of the air flue in both the sheet and pair furnaces air doors are arranged communicating with the outside air at the back of the furnace. These doors are of the raising and lowering type and admit of easy regulation of the air supply.

The gas valves are of the mushroom type, operated by means of a chain wheel and balance weights, and admit of easy regulation of the gas supply. They are sealed on the top by means of a cast iron cover. When the valves are opened they admit gas to a chamber as shown. This chamber extends the entire length of the furnaces and communicates by a series of 12-in. x 6-in. ports to the gas flue behind the bridge wall. From this flue the gas passes upward into the air flue and still passing upward is ignited and passes over the bridge walls.

The bridge walls are 18 in. thick, of first quality brick work, and are corbelled out at the top. The

object of the corbeling is to induce the flame to turn downward toward the hearth. The slope of the crown of the furnace from back to front has also this object in view.

When the flame has passed over the sheets or pairs on the hearth it is returned by means of suitable ports situated in the corners at the front of the hearths to return flues 9 in. x 3 in. under the hearth. The partitions between these flues are 9-in. x 2-in. brick set on edge. These return flues communicate with an arched flue which leads to the stack.

This arrangement of return flues under the hearth is very economical in the use of fuel, as there is a solid mass of brickwork 13½ in. thick, heated to a very high temperature, and extending under the entire hearth, so that the products of combustion are forced to perform a double duty, not only radiating downward from the crown of the furnace, but also radiating upward from the hearth and return flues. In the flues leading to the stack must be arranged a damper capable of regulation from entirely shut to full open. One of these dampers is necessary for each hearth. The outside walls of the furnace are 13½-in. brickwork, the inside 9 in. being first quality firebrick, while the outside 4½ in. is common red brick.

Furnace Doors and Guides

The furnace doors are always of the raising and lowering type. The doors themselves are cast iron boxes, open at the back, with a curved top. They are made deep enough to accommodate a 4½-in. brick lining next to the hearths. The frames are 2 in. to 2½ in. smaller on the sides and tops than the doors, and are built into the furnace brickwork. They are provided with flanges wide enough to accommodate the guides, which are of Z section, bolted to the frames, and allowing space in which the door may slide. This, of course, means that the door frame is over twice the height of the door opening; and as this leaves so little of the brickwork exposed, it has become the modern practice to plate the whole of the furnace. It is a little more expensive, but undoubtedly pays, as with a plated furnace it is possible to make the necessary repairs to the brickwork with much greater ease and certainty, and there is less danger of the good brickwork falling down when the damaged portions are removed.

The door frames rest on the fore plates, which extend through the brickwork back to and on a level with the hearth and project in front of the furnace about 6 in. to 9 in., having a depth of about 12 in. Ribs extend from the underside of the foreplate extension to the furnace front.

The sheet doors are always larger than those for pairs, the pairs varying little in length and thickness, while the packs have a very wide variation. All doors are provided with peek holes. They are raised and lowered by a system of levers and balance weights. These levers have their fulcrums set on a frame which is in turn secured to the buckstays. They are so arranged that the pull does not exceed 40 lb. and are accurately balanced so that they will "stay put."

Furnace Bindings or Buckstays

These are usually of rolled sections, channels, or I beams. The better method is to arrange two standard 7-in. channels back to back, with sufficient space between them to accommodate the tie rods. They are necessary to prevent the brickwork warping under the changes of temperature. They should be placed on each side of each door opening, and at intervals of not more than 3 ft. along the furnaces and at all corners. A suitable casting should be arranged between the channels, top and bottom, to accommodate the tie rods. These castings should have bosses not less than 3 in. thick for 1¼-in. tie rods.

Along the top of the sides of the furnace a 6 x 6 x 1-in. L should be carried immediately back of the skewback course in the vertical walls. The horizontal leg of this angle should project upon the brickwork of the furnace.

The brickwork of the outer walls should be 13½ in. thick, the inner 9 in. of first quality firebrick, and the outer 4½-in. common hard burnt red brick. It

pays, however, to make all the front of the sheet furnace first quality firebrick, as 18 in. all around the door openings must be first quality firebrick and the remainder is so small that the saving made by changing to common red brick is negligible. It follows that 18 in. all around the pair openings must be first quality firebrick.

This is a very good type of ordinary furnace, and is in common use in many plants in the United States and Europe. The general design is right, and it admits of modifications to suit special circumstances. A great point in favor of the return flues under the hearth and the underground flue to the stack is that by using this method it is not necessary to have a stack for each hearth, as was required in the older type of furnace. One stack may serve a group of furnaces, and it is quite easy to arrange a single stack to take care of all the furnaces on one side of the mill drive, which is a great economy in construction and upkeep.

This furnace would have made an ideal installation for the Quigley system of pulverized coal, but when the change was made in 1910 that system had not reached the development it has since attained.

Tandem Combination Sheet and Pair Furnace

The next distinct advance was the tandem combination sheet and pair furnace. This consists of two furnaces, one behind the other, with a single combustion chamber. The rear furnace is for bars and the front nearest the mill is for sheets. Between the combustion chamber and the pair furnace hearth is a bridge wall, and between the pair furnace hearth and the sheet furnace hearth is a second bridge wall. The products of combustion pass from the combustion chamber over the bridge wall to the hearth of the pair furnace and after heating the bars pass over the second bridge wall and serve to heat the sheets in the sheet furnace. This is entirely feasible, as the pairs require a considerably higher temperature than the sheets.

As compared with older practice this method effects quite a considerable saving in fuel and longitudinal floor space, thus saving spindle length in the mill train and mill building, but it has the disadvantage of increasing the carry of the heated bars from heater to roller, a serious matter in hot weather. These furnaces were used in England in some few mills with coal, hand fired. The tandem combination furnaces are successful in many plants and give greater satisfaction when fired by stokers than when fired by hand, owing, of course, to the greater ease in regulation.

A Typical Furnace

Fig. 2 shows a typical tandem combination sheet and pair furnace, stoker fired. The pair hearth is flat and preferably covered with specially corrugated tiles. It is arranged with two doors and the pairs are charged to the back and front of the hearth alternately. Opposite these charging doors are arranged cleaning doors. For purposes of economy these are made exact duplicates of the charging doors, and there is the other advantage of making the furnaces workable so far as the pair hearth is concerned from either side.

As will be seen from the plan view, the stoker is placed centrally on the longitudinal center line of the sheet and pair furnace, with its combustion grates on either side of the feeding worm. These grates and the feeding worm form the combustion chamber. The products of combustion pass over the bridge wall, which is 18-in. brickwork, to the pair hearth. The bridge wall is corbelled outward on the top, so as to cause the flame to follow the dotted line and cling to the hearth of the furnace.

By making the furnace crown slope toward the intermediate bridge wall between the pair hearth and the sheet hearth, the flame is impelled toward the hearth of the pair furnace and by this means a much greater percentage of the B.t.u. value of the fuel is conserved. If the crown of the furnace were level the flame would have a tendency to follow the crown and dissipate far too large a proportion of its B.t.u.s to the stack, not only wasting fuel but giving a high stack temperature. This would mean increased draft and velocity of travel of the flame over the pairs and

sheets, endangering a rash or scaling heat, which of all things in heating pairs or sheets is to be avoided.

Bridge Wall

After the flame passes over the pair hearth and has fulfilled its function of heating the pairs, it passes over the intermediate bridge wall to the sheet hearth. This bridge wall is also of 18-in. brickwork and corbelled out in the same manner as the bridge wall between the combustion chamber and the pair hearth. The hearth, which is sloped $1\frac{1}{2}$ in. in 12 in. toward the front of the furnace, is also covered with special corrugated tiles. There are two doors to this hearth, arranged in the front parallel to the roll train. They are used for both charging and drawing the sheets, and as is the case with the pair furnace they are used alternately.

Some designers build a 9-in. division wall in the center of the hearth, extending to within 9 in. of the crown of the furnace, or say to the level of the intermediate bridge wall, but in the author's opinion this does not make on the whole as satisfactory a furnace. The advantage claimed for the center wall is that it makes an extra support for the packs on their edges, and this advantage is undoubtedly there. If a sheet furnace were being designed exclusively for light sheets a center wall would be advisable, but for the heavier gages the better circulation offsets the advantage of the extra support.

In explanation, when the packs come from the doubler they are placed in the furnace on their edges, resting against the side wall, and after they are brought up to about two-thirds of the rolling temperature the

heater lays them down flat on the center of the hearth. When the proper rolling temperature is reached the heater takes a pack and passes it down the standing to the roller, replacing it with a pack which has been standing on its edge.

Flue Arrangement

In the opposite corners of the sheet hearth, immediately behind the front wall, are arranged two ports which must be correctly proportioned. These lead downward into a chamber running the entire width of the furnace. Flues about 9 in. x 3 in. lead from this chamber directly under the hearth through the intermediate bridge wall to a cross chamber immediately in front of the bridge wall proper. From this the products of combustion, which have by this time reached a comparatively low temperature, are led downward to an underground flue and thence to the stack.

The partitions between the flues are 9-in. x 2-in. brickwork laid on edge. By this arrangement the hearths, both sheet and pair, are heated from beneath as well as on top, and a highly heated mass of brick-work, $13\frac{1}{2}$ in. thick, forms a reservoir of heat, keeping the temperature of the respective hearths practically the same, notwithstanding the necessary constant opening and closing of the furnace doors. This means not only a great economy in fuel, but a much greater regularity in product.

Details of doors and guides and of furnace bindings are the same as for the furnace shown in Fig. 1, as described above.

(To be concluded)

STILL OPTIMISTIC

Youngstown Not Discouraged by Some Unfavorable Conditions—Weakness in Plates

YOUNGSTOWN, OHIO, Sept. 14.—Leading steel interests continue optimistic over the outlook for the industry for next year and insist there is no general slump in demand, although some buyers are staying out of the market temporarily because of its sold-up condition. Barring adverse and unforeseen developments, the overhanging steel requirements should be sufficient to maintain a high rate of production well into, if not through, next year. The slackening in plate demand is regarded as the only weak point in the present market. This is considered a temporary condition that will be materially corrected when railroad buying for rehabilitation purposes develops. There is no sign as yet of let-up in sheet demand. District makers have received requests to speed shipments for certain automobile interests. Valley pig iron producers have also received Eastern inquiries, which is somewhat unusual as consumers in the East do not ordinarily satisfy their requirements so far from seaboard. Outbound movement of steel continues to gain on production and it is expected that within the next 60 to 75 days the mass of the accumulation will have been cleared from yards and warehouses. There is an unshipped balance of about 4,500 cars of iron, steel and tinplate.

Makers report a strong demand for iron and steel in sections which are reported to be suffering from a slump in the automobile and rubber industries, indicating that general business is encouraging.

Accumulations Reduced

In the past 30 days there has been a reduction of 30 per cent in the overhang of manufactured goods, principally iron and steel, held up by delayed transportation. Owing to demands from the wheat country, the supply of box cars for the steel industry continues very meager.

Industrial coal supplies are being received in a fairly satisfactory manner and ore bins are being rapidly filled. Plant operations are being maintained at an average of 80 per cent in the district, with exception of the Carnegie Steel Co., which is averaging 60 per cent. There is likelihood, though, that the Carnegie

company will add one of its two idle blast furnaces at the Ohio works to the active list within a short time.

Owing to difficulties with laborers known as bottom fillers, the Girard furnace of the A. M. Byers Co., Pittsburgh, was forced to temporarily suspend Sept. 10. The men demanded a wage advance from \$7.05 to \$8 a turn.

The Sharon Pressed Steel Co. has been awarded the contract for 25,000 steel frames by the Ford Motor Co. and for 5000 frames by the Cadillac Motor Co.

Better movement of steel tonnage is attributed in large part to the co-operation between mills and the railways. The Youngstown terminal district roads are now handling an average of 20,000 cars daily and the carriers are employing extra road crews. The larger companies are unloading and releasing all equipment well under 24 hours, and some plants have returned cars three hours after receiving them.

The Plate Market

While the general quotation of independent plate makers remains at 3.50c, reports indicate that business is being placed in nearby districts at 3.25c, which is certain to force down the market in this territory unless sustained by fresh demands.

Leading merchant pig iron interests report that foundry consumers are having a breathing spell, partially due to the letdown in casting demand from the automotive trades with the result that they are reselling part of the iron being received on contract and generally easing the market as a consequence. While the tonnage involved has not been large, it has resulted in other consumers being more cautious in placing their commitments. Producers, at the same time, are showing no anxiety with respect to contracts beyond 1920, because of uncertain costs. Both furnace and foundry coke prices remain at unusually high levels and with the blast furnace demand continuing at its current high level and coke output somewhat restricted, there is apparently little prospect of lower prices.

Wider use of light plates instead of heavier gaged sheets is expected to ease the market on blue annealed.

The National Implement & Vehicle Association will hold its annual convention at Atlantic City on Oct. 20-22.

WAGES REDUCED

Sagging of Sheet Steel Prices Reflected at Bi-monthly Examination—Labor News

YOUNGSTOWN, OHIO, Sept. 14.—Reflecting the sagging tendency of sheet steel prices is the reduction of 1½ per cent on the base wage for the September-October period, for sheet mill operatives who are members of the Amalgamated Association of Iron, Steel and Tin Workers and who are paid on a sliding scale basis. At the bi-monthly examination of sales sheets on shipments for the previous 60 days, the average invoiced selling price of Nos. 26, 27 and 28 gage plain sheets was found to be \$5.70 per 100 lb., as compared with \$5.75 at the settlement two months before. The reduction in the wage rate amounts to about one-half of one per cent of the rate paid in July and August.

In the past two months, wages of sheet mill workers were at the highest point in the history of the industry, 108 per cent above base, with sheet prices at a corresponding peak. Under the September-October rate, wages will be 106½ per cent above base.

The average invoiced price of a box of 100 lb. of coke tin plate prime sheets was unchanged at \$7.40, as revealed by sales sheets, and consequently wages of tin mill workers will continue without change. The tin mill wage rate has remained stationary for the past four months. It is predicted wages in both divisions of the industry will show recessions during the next few months, as mill warehouses are well stocked.

The wage cut for sheet workers came as a surprise to the Amalgamated Association committee, one member stating affected mill employees had calculated on an 8 per cent advance. The examination was conducted Sept. 10 at Youngstown, with James H. Nutt, secretary, acting for the Western Sheet and Tin Plate Manufacturers' Association, and Fred Keightley of Pittsburgh, secretary-treasurer of the Amalgamated Association, acting for the men, assisted by a committee from the various constituent lodges.

Accidents in Wisconsin

MILWAUKEE, WIS., Sept. 13.—A bulletin of the Industrial Commission of Wisconsin upon the causes of accidents in the fiscal year ended June 30, indicates a total of 14,995 cases settled under the terms of the workmen's compensation act, which involved a total loss of 2,875,875 working days. While the number of accidents decreased 12 per cent, the loss of time was greater than in any previous annual period, due principally to the increase in number of permanent total disability and death cases. There were 226 deaths and 21 cases of permanent total disability in the past year, compared with 159 deaths and 11 disability cases in the previous year.

Safety work in the direction of compelling employers to place guards on machines appears to have effected good results, for accidents on all classes of machines were responsible for 20.9 per cent of the total. However, on the basis of days lost, such injuries were responsible for 27.1 per cent of the total. Circular saws were the most important cause of injuries, and punch presses ranked next. The number of saw and press accidents were approximately equal to those in the previous two years, but the number of days lost increased very materially.

More Workers Unemployed

MILWAUKEE, WIS., Sept. 13.—A survey of labor conditions in Milwaukee and several of the larger nearby industrial communities in Wisconsin indicates that the number of semi-skilled workers seeking employment is gradually increasing. There are few highly skilled men idle, although the call for this class of labor is light. The supply of common labor is increasing steadily, with the completion of outdoor work on farms and the dull condition of new construction.

In Milwaukee, as well as in Racine and Kenosha, the slackening of production of passenger cars and more recently the decline in motor truck output has

resulted in some curtailment of forces in automotive parts shops, but the number of men idle forms a small percentage of the total normal force.

Gray iron foundries specializing in castings for gas engines and automobiles generally report a lessening of demand, but as a rule these shops are under contract for capacity up to the end of the year. These shops have been oversold for a long time, and the opinion is expressed that normal capacity will continue to be occupied after Jan. 1.

Malleable iron as well as steel foundries filling contracts from the automotive industries note a slight slackening in demand, but some railroad requirements are beginning to appear which already have developed into actual orders.

Increased Wages in Navy Yards

WASHINGTON, Sept. 14—Details of the new wage schedule effective Sept. 16, for 286,645 employees of Navy yards, hospitals and stations, are of interest to the iron and steel industry because they indicate what Uncle Sam is paying to his workmen. The new schedule represents an increase of 5 per cent in all classes where the pay has been less than \$8 a day, but it does not include the annual bonus of \$240, amounting to 76c. per day awarded to all employees by statute. The following is a partial table of wages as approved by Secretary of the Navy Daniels for the East Coast, except where otherwise specified:

Machinists' helpers, \$4.56 (West Coast, \$4.88); molders' helpers, \$4.56 (West Coast, \$4.88); sandblasters, \$5.20; die sinkers, \$7.76; pneumatic drillers, \$5.68; press drillers, \$5.36; drop forgers, \$6.72; heavy forgers, \$12.40; foundry chippers, \$4.88; foundry furnacemen, \$5.36 (West Coast, \$5.68); open-hearth furnacemen, \$5.36 (West Coast, \$5.68); galvanizers, \$5.28; foundry ladlemen, \$5.36 (West Coast, \$5.68); machine operators, \$5.20; machinists, \$6.72; all around machinists, \$6.72; automatic machinists, \$6.72; molders, \$7.20; steel casting molders, \$7.20; patternmakers, \$7.76 (West Coast, \$8.40); armor plate pressmen, \$9.52; punchers and shearers, \$5.36 (West Coast, \$5.68); brass and copper rollers, \$6.32; sheet metal workers, \$6.72 (West Coast, \$7.20); toolmakers, \$7.20; electric welders, \$6.88; gas welders, \$6.72; wire workers, \$5.28.

Gain in Payroll at Youngstown

Substantial improvement in operating schedules of district iron and steel interests is indicated in the August payroll of \$8,324,517 at Youngstown, Ohio, a gain of \$1,921,996 over July and the best monthly wage disbursement with the exception of the \$8,419,919 April distribution. During the first seven months, \$60,649,708 was paid in wages, compared with \$57,031,920 for the corresponding period in 1919, a net gain for 1920 of \$3,617,788. The distribution for the seven months of the current year in the district is at the annual rate of \$103,970,928, as compared with an actual payment in salaries and wages in 1919 of \$81,891,279. Last year the payroll was curtailed by the steel and coal strikes and this year by the rail strike, but at the same time increased by the Feb. 1 wage advance for iron and steel workers and the recent rail wage advance.

Barring unexpected developments, the wage disbursement for this year will pass the \$100,000,000 mark for the first time at Youngstown. Bank reports show that wage payments in recent years in Youngstown have been: 1919, \$81,891,279; 1918, \$84,393,688; 1917, \$65,491,219; 1916, \$45,254,159; 1915, \$29,992,613; 1914, \$28,401,334; 1913, \$33,533,815; 1912, \$26,718,344, and 1911, \$20,748,216.

In a ten-year period, therefore, 1910-1920, indications are that the payroll will have virtually quintupled, while the population has considerably less than doubled.

Open Shop Movement

A. J. Allen, manager of the Associated Employers of Indianapolis, says that the association is starting a country-wide movement to link together all commercial and industrial organizations that are favorable to the

open shop, or "American plan of employment." Mr. Allen is the representative at Indianapolis of the National Metal Trades Association. Replies have been received from 600 organizations favoring the movement and making suggestions. Mr. Allen says: "This is not an effort to form an open shop national association. There are already a score or more of such associations in various trades and lines of business and a national open shop association is not needed. There is, however, need of some plan to co-ordinate the activities of the various local associations of this character."

In the Industrial World

The Blaw-Knox Co., Pittsburgh, recently took out a group insurance policy covering all employees who have been with the company at least three months. Those of at least three months service are insured for \$500; employees with the company from six months to one year have \$750, and those who have been with them from one to two years are provided with \$1,000 of protection. After each year of additional service the insurance is increased by \$250 until a maximum of \$2,000 is reached.

The H. C. Frick Coke Co., although operating as an "open shop," has advanced wages in keeping with the recent readjustment made in the union mine scales. Pay days will continue semi-monthly, on same dates as heretofore. Other coal and coke companies in the Connellsville district have met this wage advance.

In the east section of Sharon, Pa., the Carnegie Steel Co. has acquired 40 acres, which has been plotted and will be used for the construction of dwellings to be sold or rented to employees. There are over 225 lots in the plot. The property will be extensively improved and construction of houses commenced next spring. Both brick and frame buildings will be erected to meet demands of employees.

At McDonald, Ohio, the model settlement created by the Carnegie company for employees at its McDonald bar mills, there has been a steady expansion in new construction this year.

John H. Wormley, in charge of the mason work on two modern blast furnaces which are being built at Asansol, India, by the Indian Iron & Steel Co., writes that much of the manual labor is performed by women, varying in age from eight to 80 years, who receive the equivalent of 12c. for 10 hours' work. The bricks are all carried by women, he writes. Coolies receive 18c. per day and bricklayers 36c. which is considered a good wage. An educated clerk can be hired for bookkeeping for \$10 per month. Mr. Wormley was formerly a construction foreman employed in the Youngstown, Ohio, district. He writes that he has had 500 men and women working in his department at one time.

Strike of journeymen plumbers at Youngstown, Ohio, which started May 1, was settled on Sept. 8 when master plumbers agreed to the wage demands of the men for \$1.25 per hour. The men will receive \$10 for an 8-hour day, which is an advance of 25 cents per hour over the rate paid during the previous scale-year.

Samuel Gompers, president of the American Federation of Labor, in a letter to the Central Union of the State of Kansas, urges the holding of a conference to map out a state-wide campaign for the repeal of the Kansas Industrial Court law. Mr. Gompers describes this law as "a most vicious measure designed to establish compulsory labor."

The shops and foundries team of the Bethlehem Steel Co., Sparrows Point, Md., won the first aid meet held at the plant last week and will compete with the other teams from the company's other plants at Bethlehem, Pa., on Sept. 25.

An agreement has been reached between the employers and the structural iron workers of Cincinnati by which the men are to receive an increase of 25c. an hour, from \$1 to \$1.25.

CHARGES DENIED

Cyrus H. McCormick and National Implement and Vehicle Association Make Statements

The charges by the Federal Trade Commission that farm implement manufacturers have been guilty of concerted action to advance prices, briefly outlined in THE IRON AGE of Sept. 9, have brought forth denials by Cyrus H. McCormick, chairman of the board of directors, International Harvester Co., and by the National Implement and Vehicle Association. Mr. McCormick's statement follows:

"It should be noted that the report does not find prices or profits excessive, exorbitant, or unreasonable, yet the commission's figures on manufacturers' profits greatly exceed this company's net earnings.

"The Harvester company has never colluded with any competitor in fixing or maintaining prices.

"Not one new fact is presented in this criticism except the finding that the Harvester company's percentage of trade in the lines which it is accused of dominating continues steadily to decrease."

The statement of the National Implement and Vehicle Association, which represents 90 per cent of the producers of farm implements in the country, calls attention to the fact that the price of farm implements has increased less than the price of farm products, and that prices of all commodities other than implements necessary for farm operation have advanced in greater proportion than implements. The association also points out that implement prices have not advanced in keeping with the raw material and labor used by the manufacturers.

Figures Disagree

In referring to the report of the commission that average profits of implement manufacturers for the six-year period covered by the investigation were not excessive, but that two of the years showed unusually large profits, the association states that the figures of the commission are at variance with those found in certified public accountants' reports of the leading companies. It is obvious, the association states, that the commission's statement of profits for the two years, namely 16.6 per cent in 1917 and 19.9 per cent in 1918, failed to take into consideration income tax, interest and cash discounts. These items considered, net profits for both years shrink to less than 10 per cent, and this includes bookkeeping profits arising from inventory appreciation.

The association furthermore points out that during the war the implement business was under Government control. For a considerable portion of the time covered by the Federal Trade Commission's report manufacturers, jobbers and large dealers were licensed by the Government and a Government representative was fully informed as to prices and customs prevailing in the industry.

With respect to the alleged illegal combination of manufacturers for the purpose of increasing prices, the association states that no such combination existed. Standardization of implements was undertaken during the war at the request and direction of the War Industries Board and continued after the signing of the armistice with the approval of the board. Cost accounting was conducted in harmony with the recommendation of the Federal Trade Commission itself, and was discontinued when the commission reversed itself.

The McGill Metal Co., Valparaiso, Ind., employing 200 persons, has practically shut down, large automobile companies having cancelled contracts with the company for parts. The Remy Electric Co., Anderson, Ind., manufacturing automobile accessories, is on part time only.

The Peerless Drawn Steel Co., Massillon, Ohio, has placed its new bar mill in operation. This is located in the former plant of the Massillon Iron & Steel Co., which was purchased some time ago by the Peerless company.

Two Baltimore Plants Purchased

The Kennedy Corporation, Baltimore, controlled by Joseph P. Kennedy, its president, has bought the plant of Fairbanks, Morse & Co. and the entire capital stock of the Baltimore Malleable Iron & Steel Casting Co. The total purchase price of both plants was \$1,850,000, according to an announcement by the Industrial Bureau of the Board of Trade, confirmed by Mr. Kennedy.

The Kennedy Corporation was incorporated under the laws of Maryland on Jan. 6, 1920, with a capital of \$2,000,000, to specialize in the manufacture of castings for automobiles and agricultural tractors and the production of railroad parts, such as freight car and locomotive castings. The two new plants which the corporation has acquired will be added to the equipment it already possesses.

The plants of both companies absorbed by the Kennedy Corporation adjoin the already existing plant of the corporation. The Fairbanks, Morse & Co.'s plant consists of two brick and concrete structures, and is bounded by Winder Street, Elizabeth Lane and Charles Street.

The Baltimore Malleable & Steel Castings Co. is one of the largest malleable casting companies in the country. At present it is operating at full capacity. It will retain its present name.

The Kennedy Corporation will serve merely as a holding company. Frank D. Chase, Inc., Chicago, industrial engineer and builder, has been given the contract for necessary extensions or alterations.

Sterling Steel Foundry Expansion

Improvements and extensions are in progress at the plant of the Sterling Steel Foundry Co., Braddock, Pa., which, when completed, will make possible the doubling of the present capacity of the works. A new mold shop, 60 x 300 ft., with a lean-to, 25 x 200 ft., is being erected, the latter section to house the core ovens to be constructed with the completion of the building. Other improvements will follow on the heels of the completion of the mold shop. It is proposed to remove a wooden structure in which now are housed gas engines, from which the plant derives its power, and to replace it with one in which the offices of the company will be located. Purchased electric power is to be substituted and the building for the new plant already is up. This building is of brick and steel construction, 40 x 50 ft., and is equipped with two 250-hp. Westinghouse motor-generator sets and a direct connection air compressor, with a capacity of 1500 cu. ft. per min., which is to be furnished by the Chicago Pneumatic Tool Co.. The motor-generators provide, of course, for the direct current for the cranes, of which the plant already has 13.

The Sterling Steel Foundry Co. was organized in 1911 and is headed by George W. Smith, who for 10 years was general superintendent of the Union Steel Casting Co., Pittsburgh. Other officials are: William Neace, vice-president; H. G. Smith, treasurer; M. A. Quinn, secretary, and George J. Chandler, sales manager. They with Nelson McVicker and Alexander Martin form the board of directors. The land holdings of the company comprise four acres lying along the line of the Pittsburgh & Lake Erie Railroad, on Eighth Avenue, Braddock, and running to the Monongahela River, along which the company recently completed the construction of a concrete retaining wall of 400 ft. Both the Pennsylvania and Baltimore & Ohio railroads run through Braddock and although the company is local to the Pittsburgh & Lake Erie Railroad, its plant is removed only a few blocks from the service of the other roads.

The company produces open-hearth steel castings, ranging in weight from 100 lb. to 100,000 lb. In process at the plant at present is a spider for an electric generator for shipment to Canada weighing 88,000 lb. and also two dreadnaught spectacle castings, each of 90,000 lb. Steel is produced in two 25-ton acid open-hearth furnaces and conveyed by ladle and cranes to the molds in various parts of the shop. The company has a modern machine shop constructed and equipped during the war period. Two buildings are used for the storing

of patterns, while flask equipment is stored in the main building for convenience. Chipping off castings and ramming of flasks is done by compressed air. Risers on castings are removed by gas flame cutters.

Mining and Quarrying Drills

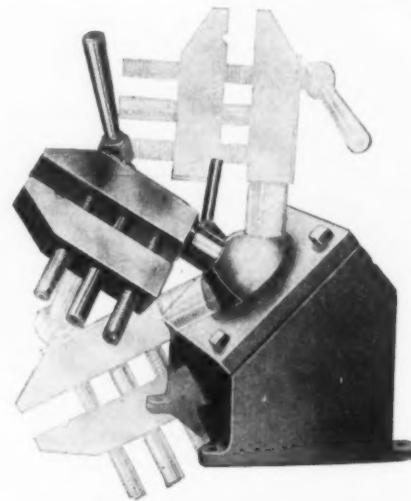
A new type of drill for light mining and quarrying and one-man operation has been added to its line of drills by the Denver Rock Drill Mfg. Co., Eighteenth and Blake streets, Denver, Col. The drill is equipped with a new type of spool valve, having a positive action. The rotation mechanism, it is explained, is designed so as to reduce the stresses in both teeth and pawls. Lubrication is effected by pulsations of air which gradually feed the oil from a reservoir at the side of the cylinder into all parts of the machine.

The drill is built in three models, a dry auger drill for work in iron, coal and other soft formations; a combination wet and dry rock drill for work in all kinds of rock and under all conditions, either above or below ground, and a dry rock drill particularly adapted for work in wet shafts or where out-of-door conditions prevail.

Hand Vise and Base

A hand vise for holding small parts that are to be drilled or repaired is a recent product of the Newman Mfg. Co., Cincinnati. It is intended especially for tool and jig makers, die sinkers and machinists. An adjusting lever operates the three gears in unison to open or close the jaws. A "V" in the lower jaw is provided for round work. The length, over all, is 9½ in., width of the jaws, 1 in., and the extreme distance between the jaws when open, 2½ in.

When a bench vise or equally strong holder is not available, the base shown in the illustration is available



An Adjustable Lever Operates Three Gears in Unison to Open or Close the Jaws of the Hand Vise. A ball socket in the base permits of turning the vise in different directions

for use with the hand vise. A quarter turn of the adjusting lever opens the ball socket and permits of turning the vise in almost any direction. Another quarter turn of the lever closes the ball socket and clamps the vise at the desired angle. This base is of special value when the job must be shifted constantly.

A program folder featuring the convention of the Association of Iron and Steel Electrical Engineers to be held in New York, Sept. 20 to 24, at the Hotel Pennsylvania, has been issued by the Cutler-Hammer Mfg. Co., Milwaukee and New York, for distribution at the convention. Pages are devoted to a list of the papers to be presented, plan of exhibits and a small map of a section of New York City indicating the location of the main hotels, stores, theaters, etc.

A fire in the three-story brick building of the Wilson Body Co. plant in Detroit Sept. 10, resulted in a loss of about \$100,000. One man was killed. The plant was devoted exclusively to the production of Ford automobile bodies.

LATIN-AMERICAN MANGANESE

Rise and Decline of Ore Imports From Those Countries—Future Relations

BY KIRBY THOMAS

The imports of manganese ore from Latin-American countries before 1914 were practically all from Brazil. The imports from Brazil covering a normal pre-war period were as follows: 41,600 tons in 1911, 81,585 tons in 1912, 70,200 tons in 1913, and 113,924 tons in 1914. At no time during these years did the import value exceed half a million dollars, except in 1914, when it was nearly three-quarters of a million. The importations to the United States in 1911 represented 40 per cent of the total production of Brazil, and this proportion steadily increased until in 1913 and the first half of 1914 it was about 60 per cent. During this period, and prior to it, there were small and irregular shipments from Cuba and Mexico. The first important imports to the United States from Cuba began in 1915, when 5141 tons were imported.

The imports increased enormously during the war, due to the stimulus of high prices and direct encouragement by the Government in some cases. The imports from Brazil were 275,579 tons in 1915 and 471,837 tons in 1916. In 1917 they were 512,517 tons, and in 1918, 345,877 tons. Several other countries came forward in the import lists during the war period.

The imports of manganese ore from Latin America in the calendar year 1918 were as follows:

Caribbean Countries and Mexico		
	Gross Tons	Value
Cuba	82,975	\$2,757,193
Costa Rica	9,650	290,833
Panama	5,607	262,520
Mexico	5,251	169,357
<i>South American Countries:</i>		
Argentina	849	39,127
Brazil	345,877	10,174,138
Chile	2,998	48,760
Ecuador	107	3,422
Peru	20	641

The total imports from the Caribbean countries and Mexico in 1918 were nearly 100,000 tons, valued at about \$3,500,000, and from the South American countries 350,000 tons, valued at more than \$10,000,000.

The hope that this substantial trade item in Latin-American commerce might be continued after the war is not borne out by the available statistics, as shown:

1917	Tons	Value
Cuba	44,511	\$612,413
Brazil	512,517	8,587,296
1918		
Cuba	82,974	2,757,193
Brazil	345,877	10,174,138
1919		
Cuba	35,520	1,433,202
Brazil	246,592	7,177,071
<i>Two months ended with April, 1919:</i>		
Cuba	73,487	2,952,456
Brazil	307,399	9,428,248
<i>Two months ended with April, 1920:</i>		
Cuba	6,166	214,369
Brazil	119,433	3,074,601

The imports from Costa Rica, which began in 1916, have continued in good amount. The 1916 production was 1305 tons, with 8191 tons in 1917, 9893 tons in 1918 and 7851 tons in 1919. The value of the 1919 production was \$300,445. All of the production from Costa Rica is imported by the United States. The data available for 1920 show a further continued decrease in manganese ore imports from Latin-America.

The total imports from all sources into the United States during the periods covered by the foregoing tables were as follows: 1917, 629,972 tons; 1918, 491,308 tons; 1919, 333,344 tons; 10 months ended with April, 1920, 186,986 tons. It will be seen that the decrease in the imports from Latin-America is fairly in proportion to the totals for the corresponding years.

However, this relation is more apparent than real, for the supply of manganese for the steel industry, the principal user, has not decreased in the same proportion as the imports of manganese ore. The steel industry has been receiving an equivalent in the form of ferromanganese, shipped from England, where it is mainly produced now from Indian ore, as the Russian ore is still unavailable. In this procedure the Latin-

American countries are deprived of the trade of the United States in this important commodity and the manufacturing profit from the ferromanganese is diverted to the British industry.

Such a state of affairs naturally works against the continuing of the preponderance in Latin-American trade which the United States acquired during the war. An effective remedy is for the American consumers of manganese to acquire and operate some of these Latin-American resources, thus controlling a supply and the profit from the mining and manufacture into ferromanganese to American interests and at the same time affording a very secure and profitable investment for surplus American capital. It is probable, also, that the inauguration of electrical smelting of manganese ore in Brazil, as is proposed, and the inauguration of mills to concentrate the low grade ore of Cuba may tend to restore the declining trade in manganese ore with Latin-America.

In the above the unit of measure is the gross ton and the value given is the actual value or wholesale price at the time of exportation in the principal markets of the country of origin.

Large Boilers for Ford Motor Co.

Boilers of exceptional size now in progress of erection at the plant of the Ford Motor Co., Detroit, are described in a pamphlet prepared by the George T. Ladd Co., Pittsburgh, and distributed to members of the Cleveland Engineering Society, who visited the plant of the Ford Motor Co., Aug. 28. Each boiler contains 26,470 sq. ft. of heating surface, which is exclusive of superheater heating surface, or surface of future economizer. Nearly six miles of 3½-in. tubing was required for each boiler. Steam will be generated at 240 lb. pressure per sq. in., and superheated 200 deg. Fahr. The total height of the boiler from the ash pit floor to the top of the superheater piping is 82 ft. 9¾ in.

The boilers will be fired with a combination of pulverized coal and blast furnace gas. A pulverizing plant using air separation mills is being installed, and coal will be conveyed to the boilers from this plant by a series of screw conveyors. Each boiler will be equipped with 12 Lopulco feeds and four Lopulco triplex burners firing the coal in vertically from the top. They will also be equipped with eight gas burners for the purpose of injecting blast furnace gas horizontally through the side, the gas flame and the pulverized fuel flame so uniting at the proper point in the combustion chamber as to materially improve and increase the efficiency of the blast furnace gas. The possible capacity ratings, it is stated, when burning powdered coal, will be high, as the firing equipment is of such a capacity as to burn completely sufficient coal to produce 400 per cent rating continuously. The day operation of the boilers will be around 250 per cent of rated capacity.

The boilers and settings were designed and furnished by the George T. Ladd Co., Pittsburgh, the superheaters by the Locomotive Superheater Co., New York, and the pulverizing and fuel burning equipment by the Combustion Engineering Corporation, New York.

The National Bolt & Nut Co.'s plant on the Allegheny River at Sixty-second Street, Pittsburgh, which was destroyed by fire Sept. 26, 1919, has been rebuilt on a much larger scale and is now running at full capacity on railroad track bolts, structural, boiler, bridge, ship, and tank rivets, hot pressed and cold punched nuts. This company has completed a dock for handling raw and finished material by river, and recently received its first shipment from the Carnegie Steel Co.'s Duquesne mills. It is shipping 1000 kegs of bolts, nuts and rivets daily.

The Boston District Ordnance Salvage Board, on Sept. 22, 23 and 24, will sell at public auction at the Scituate Proving Grounds, Scituate, Mass., a large amount of Government owned property, including 1,750,000 lb. brass, almost 2,000,000 lb. steel, 116 tons clean brass scrap, 15 tons belting and a large amount of heavy hardware.

TESTING GALVANIZED COATINGS

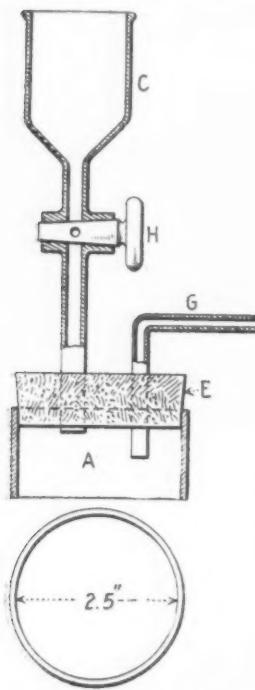
New Method Can Be Used in the Field—Surface Not Mutilated

Galvanized coatings on culverts, sheets, and by a slight modification, on wire nails and other small units, can be tested in the field or laboratory by a new method described in a paper by Allerton S. Cushman, presented at the twenty-third annual meeting of the American Society for Testing Materials, at Asbury Park, N. J. An advantage of the method is that it can be used in the field as well as in the laboratory, and will determine the weight of galvanized coating on the unit area, regardless of convolutions or corrugations.

It is customary to purchase galvanized sheet metal and wire to specification governing the weight of spelter in ounces per square foot. In dealing with sheet

is set down in place on the galvanized surface to be tested. The area of the spot covered by vessel A being known, the number of cubic centimeters of hydrogen multiplied by a factor gives the ounces of zinc per square foot. The stripped and thoroughly pickled test spots can be regalvanized in the field by dusting them over with a mixture of granulated zinc chloride and heating with a small plumber's blow torch, or if desired, they can be covered with protective paint or compound.

Briefly, in operation the apparatus is filled with water, and concentrated hydrochloric acid is placed in the filling tube and allowed to enter the apparatus, the generated gas displacing the water. When the evolution of hydrogen gas has ceased or only a bubble of gas comes every few seconds, the apparatus is filled with water to displace the gas. The gas is measured at 20 deg. C., with the water inside the cylinder the



Apparatus for Testing the Weight of the Galvanized Coating on a Unit Area, Regardless of Convolutions or Corrugations, on Sheets, Culverts, and by a Slight Modification, on Wire Nails and Other Small Units.

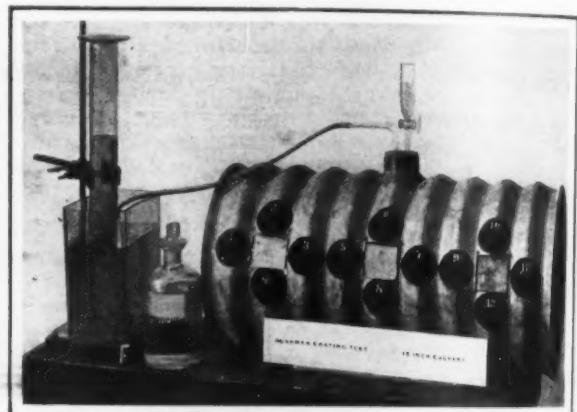
At the right, the apparatus is shown in use, testing the coating on a 12-in. culvert.

metal the weight of spelter is recorded for both sides so that a 2-oz. coating means 1 oz. on each side. In 1915 J. A. Aupperle proposed the hydrochloric acid-antimony chloride method for stripping $2\frac{1}{4}$ -in. squares of sheet metal and further adapted the method for wire

by calculating and tabulating ounces per square foot from the gram loss on unit lengths of wire of any given diameter and gage. For articles of irregular surface the method is not always adapted.

Experience with tests by this method led Dr. Cushman to believe that if it were possible to collect the hydrogen gas given off from a known area of any surface the weight in ounces per square foot could be at once determined. Preliminary calculations showed that if such a method of testing could be worked out any error due to slight variations in the volume of gas collected, owing to variable temperature and pressure, would be practically negligible when translated into ounces per square foot of zinc. On the other hand, the area of any spot under test must be accurately known, as error due to unknown or variable area would be considerable.

With these considerations in mind, experiments were begun with a glass apparatus which was finally developed by Dr. Cushman in co-operation with J. A. Aupperle and H. E. Brooks of the research department of the American Rolling Mill Co., into the improved apparatus shown in the accompanying illustration. This consists of a tinned iron ring A, No. 12 two-holed rubber stopper, E, a glass thistle tube, C, with ground glass valve, H, a graduated water displacement burette which connects with soft-rubber tubing to the glass outlet tube, G. The metal ring for flat sheets is ground true at the bottom for use on flat corrugated sheets, while other rings are cut and ground with emery to fit the corrugations and curvatures of finished culverts of the various sizes in use. Plastic clay, known as "Plastaline," is placed around the base of the ring to make an acid-tight dam or joint when the apparatus



same level as the water outside the cylinder. The number of cubic centimeters of hydrogen at 20 deg. C., multiplied by the factor, will give the weight of the spelter coating. From all tests conducted, Dr. Cushman concludes that the apparatus as now constructed and run will give results accurate to within 0.05 oz. per sq. ft.

New England Foundrymen's Association

H. M. Lane, the H. M. Lane Co., industrial engineer, Detroit, was the speaker of the evening at the September meeting of the New England Foundrymen's Association at the Exchange Club, Boston, Sept. 8. He gave an illustrated talk on "Fitting the Foundry to Its Work," which was based largely on problems his organization has encountered in foundry construction and practice.

Some excellent slides were shown of a foundry operating special carrier system and producing automobile cylinder castings at 7c. per lb. Slides showing highly specialized core-room benches, loaded from the rear, operated in the plant of the Saginaw Products Co., where the core-room output was increased more than five times per operator, were interesting, as was the discussion, and illustrations of various types of tumbling barrels, sand-mixing machines, dumping buckets and all metal draw, continuous, re-handling and rack ovens. Mr. Lane expressed himself as certain that the electric annealing oven will form an important part of the equipment of foundries in the future.

A. B. Root, president, was chairman. T. J. Kiley & Son, iron and metals, South Boston, and the Fremont Casting Co., Worcester, Mass., were elected members. Approximately 100 attended the meeting.

The application of the American Railroad Association for a further extension of time within which to equip freight cars with safety appliances, has been denied by the Interstate Commerce Commission. The last extension of time granted by the commission expired on March 1, various extensions having been granted over a period of eight years and eight months from July 1, 1911, to March 1, 1920.

RECORD FREIGHT TRAFFIC

Increased Efficiency of Labor Was an Important Factor

WASHINGTON, Sept. 14.—Increased efficiency on the part of labor and a record amount of freight traffic for that month of the year is shown in reports for the month of August, received by the Car Service Division of the American Railroad Association.

Reports to the division show that 3,853,822 cars of freight were loaded during August. This compares favorably with the banner week of the Railroad Administration in May, 1918, when approximately 1,000,000 cars of freight were loaded in a single week.

In the week ended Aug. 28, freight cars totaling 985,064 were loaded, or within 15,000 of one of the heaviest weeks of loading under war demands. The total for the week ended Aug. 7 was 942,150; for the week ended Aug. 14 it was 962,352, and for the week ended Aug. 21 it was 964,256.

It is supposed that the increase in freight rates effective Aug. 26 caused an unusual amount of freight to be loaded prior to that date in order to obtain advantage of the lower rates then in effect.

The car shortage in the United States and Canada in the week ended September was 151,440, as compared with 142,000 the week before. In the United States alone the shortage was 146,080.

Figures of the Bureau of Statistics of the Interstate Commerce Commission show 23,434,381,000 net ton miles of freight traffic in the month of July as compared with 20,391,992,000 in the same month of 1919. These figures show the number of miles one ton of freight was carried.

Will Close Shipyard

The Barde Steel Products Corporation, 114 Liberty Street, New York, has acquired considerable surplus steel and iron, including fabricated material, from the Emergency Fleet Corporation, including stock at the Pusey & Jones yard, Gloucester City, N. J. All material of this kind at the local shipyard will be removed. Notice has been issued to employees at the plant that the yard will close effective with the launching of the last vessel, about Sept. 15. It is said that the Government will relinquish control of the property shortly after this time. The Shipping Board has expended about \$5,000,000 at the plant, with investment for the most part in the section known as the New Jersey yard. The board has been restrained by order of Justice Siddons, District of Columbia Supreme Court, from foreclosing a mortgage of this amount (\$5,000,000), on the Pusey & Jones plants at Wilmington, Del., and at Gloucester City.

May Release 15,000 More Cars

WASHINGTON, Sept. 14.—A further modification of Service Order No. 7 limiting open top cars to the transportation of coal with certain exceptions is possible as a result of representations made to the Interstate Commerce Commission by the steel industry. The request has been made that the 38-in. limitation in the definition of coal cars be changed to 42 in. The original order defined coal cars as those having sides in excess of 36 in. Later at the request of the steel industry that definition was changed to make it 38 in. This gave the steel industry about 15,000 additional cars. It is now urged that the figure be changed to 42 in., which it is estimated will release about 25,000 additional cars for the steel industry.

The preference given coal during the summer so far as open-top cars are concerned has caused serious difficulties for the steel industry. The steel men have shown the commission at different times conditions existing at the steel plants as a result of the inability to get sufficient open top cars to move manufactured products. With an improvement in the coal situation, the steel traffic managers have insisted that the industry was entitled to more consideration.

The open top car order expires on Sept. 19. The

order was issued first for 30 days early in the summer and extended at different intervals. The commission is now considering whether to extend the order for a further period. The question of changing the definition of coal cars will be acted upon probably at the same time as the proposed extension of the order. In case the coal situation is considered to have improved to such an extent as not to require extension of the order, there will be no occasion for the proposed modification of the coal car definition.

Boston Plant to Be Sold

Unless otherwise ordered by the court on or before Sept. 17, the plant and equipment of the Nelson Blower & Furnace Co., South Boston, will be sold at public auction by the co-receivers, F. Alexander Chandler and Carleton Hunneman, not earlier than Oct. 1, and not later than Oct. 25, for the benefit of the creditors. The plant and equipment will be sold separately.

Mr. Chandler was appointed receiver for the company in September, 1919. Mr. Hunneman recently was appointed co-receiver on a petition by the Pierce Governor Co. The above sale does not include the plant and equipment of the Nelson Machinery Co., Taunton, Mass., which in effect was a subsidiary of the Nelson Blower & Furnace Co. In January the machinery company was placed in the hands of Bion C. Pierce, Taunton, as receiver.

Great Northern Railroad to Buy Equipment

SEATTLE, Sept. 9.—Ralph Judd, president, and some other officials of the Great Northern Railroad were in Seattle, Wash., last week to inspect the terminals of the road in that city and also to look after its other interests. While there President Judd said that his road would make but a limited investment in new equipment this year, preferring to wait before making larger purchases until general business and financial conditions are better. However, he stated that his road had decided to build at once 1000 new freight cars, 500 new refrigerator cars and 50 new freight locomotives. The refrigerator cars will be built in the Northwest as they will be of wood construction, and it is the fixed policy of the Great Northern to specify Douglas fir only in letting contracts for wooden cars. He said his road was willing to pay the higher cost entailed in building these cars in the Northwest and to have them built of this material. President Judd stated that next year his road expected a considerable number of new flat cars and stock cars. In referring to the general car shortage, and especially to that being experienced by the Great Northern, he said that this was largely caused by the failure of foreign roads to return cars promptly.

Pittsburgh Foundrymen's Meeting

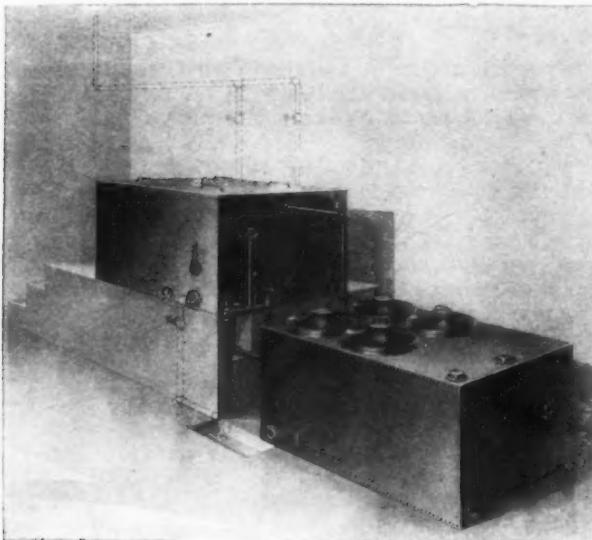
C. H. Bierbaum and W. P. Parrock, of Lumen Bearing Co., Buffalo and Youngstown, will be the speakers at the regular monthly meeting of the Pittsburgh Foundrymen's Association, to be held Monday evening, Sept. 20, at the Chatham Hotel, Pittsburgh. Mr. Bierbaum, the principal speaker, is a member of A. S. M. E. Bearing Alloys Committee, and will discuss the scientific side of bronze alloys, while Mr. Parrock will speak in a general way on non-ferrous alloys, and touch upon foundry practice to some extent.

The American Metal Co., 1107 South Washtenaw Avenue, Chicago, has practically completed a new warehouse, 80 x 200 ft., at 28-30 South Kedzie Avenue, to cost \$50,000. The company will continue to deal in sheets, steel bars, strip steel, etc., and, because of its increased storage space, is ready to make new mill connections. Its present warehouse on South Washtenaw Avenue will be retained indefinitely, but eventually the entire business will be moved to the South Kedzie Avenue property which contains space which will permit quadrupling the size of the warehouse just completed. The company has been reincorporated with \$150,000, all paid in, and has elected J. M. Leavitt, president, and Nathan Jacobs, secretary and treasurer.

Cutting Oil Filtration and Sterilization

A filtering and sterilizing system for cutting oils has been designed by S. F. Bowser & Co., Fort Wayne, Ind. From the machines and chip separators the oil, either by gravity or special provision, can be delivered to the filter and sterilizer, which automatically removes foreign matter and sterilizes the fluid. After going through a series of compartments, screens, filtering devices, etc., the liquid is delivered to the filter tank, which acts as a temporary storage. From this tank the oil can be returned to the different machines the same as new oil and used again.

The conservation of the oil, it is pointed out, permits



Bowser Apparatus for Filtering and Sterilizing Cutting Oil

a better grade of oil to be used—one which will not foam, rust or corrode the work or tools. The manufacturer states that the systems are so designed that they can be adapted to the various conditions encountered.

Butler Art Institute Presented to City of Youngstown, Ohio

Joseph G. Butler, Jr., veteran iron and steel manufacturer of the Mahoning Valley, on Sept. 10 formally presented to the city of Youngstown, "for the edification and enlightenment of the people," a new art gallery on Wick Avenue, representing, with an elaborate collection of paintings, an investment of \$700,000. An endowment fund of \$200,000 has been partly paid in and the remainder provided for, Mr. Butler announced. The institution is to be known as the Butler Art Institute and governed by a board of trustees. Acting with Mr. Butler in this capacity are his son, Henry A. Butler, Jonathan Warner, president Trumbull Steel Co., John Stambaugh, director Brier Hill Steel Co., and John Willard Ford, attorney and nephew of Mr. Butler. Additions will be made to the main building from time to time, stated Mr. Butler, and a small auditorium will be erected in 1921. The gift was formally accepted by the mayor, F. J. Warnock, while addresses were delivered by other representative citizens expressing appreciation of the community.

Imports of Tungsten Bearing Ore

WASHINGTON, Sept. 14.—Imports of tungsten bearing ore during July totaled 71 tons valued at \$22,287, according to the Bureau of Foreign and Domestic Commerce. Included in this amount was 49 tons valued at \$12,946 from China, 21 tons valued at \$9,291 from Hong Kong, and one ton valued at \$50 from Panama. There were no exports of tungsten or ferro-tungsten metal during the month.

Imports of tin bars, blocks or pigs, grain or granulated, in the United States during July totaled 17,584,167 lb. valued at \$11,146,018. Of this amount 10,097,-

914 lb. valued at \$6,954,449 came from the Straits Settlements; 4,029,752 lb. valued at \$2,137,021 came from England, and 2,318,059 lb. valued at \$1,400,298 came from Hong Kong, and the rest from the Netherlands, China, Dutch East Indies, and Australia.

Steel Corporation's Orders Decrease

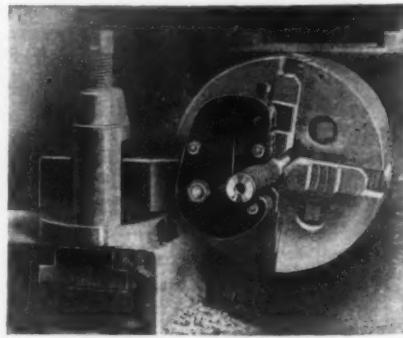
Unfilled orders on the books of the United States Steel Corporation Aug. 31, were 10,805,038 tons, compared with 11,118,468 tons on July 31. This is a decrease of 313,430 tons, against an increase of 139,651 tons in July, one of 38,352 tons in June, one of 580,718 tons in May, 467,672 tons in April, 389,994 tons in March, 216,640 tons in February and 1,020,075 tons in January. This decrease is the first one shown in monthly reports since May, 1919. The unfilled tonnage a year ago was 6,109,103 tons, or 4,695,935 tons less. The table below gives the unfilled tonnage at the close of each month beginning with January, 1917:

	1920	1919	1918	1917
Jan. 31.....	9,285,441	6,684,268	9,477,853	11,474,054
Feb. 28.....	9,502,081	6,010,787	9,288,453	11,576,697
March 31.....	9,892,075	5,430,572	9,056,404	11,711,644
April 30.....	10,359,747	4,800,685	8,741,882	12,183,083
May 31.....	10,940,465	4,282,310	8,337,523	11,886,591
June 30.....	10,978,817	4,892,855	8,918,866	11,383,287
July 31.....	11,118,468	5,578,661	8,883,801	11,844,184
Aug. 31.....	10,805,038	6,109,103	8,759,042	10,497,049
Sept. 30.....	.....	6,284,638	8,297,905	9,833,477
Oct. 31.....	.....	6,472,668	8,353,293	9,099,675
Nov. 30.....	.....	7,128,330	8,124,663	8,897,106
Dec. 31.....	.....	8,265,366	7,379,172	9,381,718

The largest total of unfilled orders was on April 30, 1917, when it was 12,183,083 tons. The lowest was on Dec. 31, 1910, at 2,605,747 tons.

Knurling Tool Relieves Side Strain

A knurling tool designed to relieve the side strain on the work when the speed of the lathe is increased has been placed on the market by the Newman Mfg. Co., Cincinnati. The tool is designed so that the knurls are not directed against one side of the work; thus a tail stock is not required on either light or heavy stock and burning out of the tail stock centers is eliminated. The tool centers automatically after being set and



Upper and Lower Wheels of the Newman Knurling Tool Relieve Side Strain and Permit of Rapid Work

oscillates freely to accommodate itself to "wavy" stock.

Each tool is furnished complete with one set of standard knurls cut straight in fine, medium or coarse pitches; either checkered, or straight. The knurls are fitted in case-hardened lugs and can be readily removed or exchanged. The proper adjustment is made by turning the screw at the top of the jaws.

The Boyer-Campbell Co., Detroit, has been appointed exclusive representative in its territory for the Union Twist Drill Co., Athol, Mass. Its present stock of cutters, drills, reamers, etc., will be replaced as rapidly as possible with a complete stock of the Union product.

Plans have been developed by the Sharpsville Boiler Co. of Sharpsville, Pa., to double the capacity of its plant. Additional fabricating equipment will be installed, four electric cranes, riveting plant and auxiliary machinery. Increased storage yards for raw and finished material will be provided.

ARSENIC IN STEEL

Effect of Varying Quantities in Plain Carbon Steel—Static Properties of Heat-Treated Product

Whether arsenic in steel in varying percentages has a good or bad effect has been studied at the Naval Gun Factory, Washington, by its chief chemist and metallurgist, P. E. McKinney. An abstract of the results, published in the *Journal of the American Society of Mechanical Engineers*, is as follows:

In view of the fact that the question has frequently arisen as to the effect of varying percentage of arsenic in steel, it was deemed expedient to make a few experiments in connection with the regular manufacturing operation on the effect of this element.

Two series of experiments were made, the first consisting of a comparison between a plain converter steel and steel from the same heat to which had been added 0.10 per cent arsenic. The second series was identical except that an addition of 0.50 per cent arsenic was made.

After adding the final addition to a regular con-

steel containing arsenic as compared with that to which no arsenic additions were made. In the pouring or forging the steel acted normal in every respect.

While it is evident from these experiments that 0.3 per cent of arsenic is not injurious, as far as static testing can disclose, the fact must not be lost sight of that it is extremely hard to get rid of arsenic after it is once present in steel, and if the steel is used for scrap purposes after its usefulness has ceased, there is a constant automatic augmentation of the arsenic content which will in time get beyond the limits desired. It would also be interesting to note the effect of arsenic upon shock-resisting qualities of the steel which is of major importance where ordnance work is concerned.

The gun factory hopes to have an impact machine installed in the very near future, and further experiments along this line will be carried out.

Railroad Loans Approved

WASHINGTON, Sept. 14.—The Interstate Commerce Commission has approved a loan of \$6,073,400 to the Seaboard Air Line Railway Co. The sum will be used for equipment, additions and meeting maturities.

To meet the loan of the Government the railroad

Table of the Effect of Varying the Percentage of Arsenic in Steel

Chemical analysis.....	First Series										Remarks
	Heat No.	C	Si	P	S	Mn	As				
	C-1082	0.18	0.26	0.025	0.021	0.60	0.031	No arsenic added			
	C-1082A	0.10	0.24	0.023	0.030	0.62	0.089	0.10 per cent arsenic added			
Oil-quenched, Drawn, Annealed, Deg. Fahr.	Oil-quenched, Drawn, Annealed, Deg. Fahr.	Heat No.	Elastic Limit, Lb. Per Sq. In.	Tensile Strength, Lb. Per Sq. In.	Elong., Per Cent	Reduction of Area, Per Cent	Bend, Rupture	Deg.			
1400	1400	C-1082	48,300	75,300	32.50	62.30	138,900	...	Perfect	Fracture	
1400	1450	C-1082A	43,200	72,200	33.50	62.79	125,520	...	1/2 cup		
1400	1450	C-1082	48,400	92,900	26.00	57.22	162,100	180	8/10 cup		
1400	1450	C-1082A	53,500	88,100	28.50	60.56	164,800	180	Perfect	Fracture	
1400	1450	C-1082	58,600	88,400	28.25	60.56	157,800	...	3/4 cup		
1400	1450	C-1082A	53,400	85,300	31.25	64.42	179,200	...	3/5 cup		
1400	1450	C-1082	53,500	84,500	32.25	65.43	161,100	...	95/100 cup		
1400	1450	C-1082A	53,500	80,000	32.00	67.74	162,500	...	3/4 cup		
Second Series											
Chemical analysis.....	Oil-quenched, Drawn, Annealed, Deg. Fahr.	Heat No.	C	Si	P	S	Mn	As			
		C-1123	0.13	0.25	0.019	0.048	0.57	0.065	No arsenic added		
		C-1123A	0.12	0.33	0.018	0.045	0.57	0.310	0.50 per cent arsenic added cold		
Oil-quenched, Drawn, Annealed, Deg. Fahr.	Oil-quenched, Drawn, Annealed, Deg. Fahr.	Heat No.	Elastic Limit, Lb. Per Sq. In.	Tensile Strength, Lb. Per Sq. In.	Elong., Per Cent	Reduction of Area, Per Cent	Bend, Rupture	Deg.			
1400	1400	C-1123	35,500	67,700	32.00	68.00	147,300	...	3/4 cup	Fracture	
1400	1450	C-1123A	39,600	67,800	31.50	67.50	139,000	...	1/2 cup		
1400	1450	C-1123	45,800	75,100	31.00	62.20	143,800	180	3/5 cup		
1400	1450	C-1123A	45,800	77,600	25.00	58.50	141,300	180	1/4 cup		
1400	1450	C-1123	45,800	72,100	30.15	65.40	141,500	...	3/5 cup		
1400	1450	C-1123A	49,600	74,000	33.50	64.60	143,700	...	3/5 cup		
1400	1450	C-1123	42,700	69,300	32.00	70.40	157,300	...	3/5 cup		
1400	1450	C-1123A	48,800	73,400	33.50	69.50	153,600	...	3/4 cup		

verter heat, a 3 1/4-in. diameter by 32-in. long split ingot mold was top-poured from a bull ladle for this plain test. Then about 3 in. of steel was poured into a hot bull ladle, of about 100 lb. capacity, to cover bottom, the metallic arsenic mixed with several times its weight of thermit and wrapped in paper, was thrown in ladle, the ladle was then filled with steel, mixed and top-poured into a similar mold. This constituted the arsenic test ingot. Both series were handled in the same way.

The ingots were stripped the following morning, sent to forge shop, heated and forged longitudinally from bottom end to 3/4 in. sq., and cut into 6-in. lengths—a convenient size for test bars. They were not soaked or annealed before forging, but both series worked excellently while being forged. All of the 6-in. lengths were annealed at 1400 deg. Fahr., and then heat-treated as shown in table 1. The ingots whose heat numbers are followed by the letter A are those to which arsenic was added.

The results of these tests show practically no difference between the steel containing no arsenic and that to which arsenic has been added. If anything the results show slight superiority in favor of the steel containing arsenic. While these tests were made on small ingots and the test piece received considerable longitudinal forging work, the results of these preliminary tests would not indicate that arsenic has the detrimental effect to steel attributed to it by some authorities.

There is no noticeable difference in the properties of

itself is required to finance \$3,982,600. The railroad expects to acquire refrigerator cars at a total cost of \$1,058,000, to make additions and betterments to promote the movement of freight cars at a total cost of \$750,000, and to meet 1920 maturities aggregating \$8,248,000.

The commission also has approved a loan of \$896,925 to the Terminal Railroad Association of St. Louis to aid the company in meeting its demand notes and in making additions and betterments. The company must finance an additional amount equal to about \$1,650,000.

Steel Steamers for Sale

WASHINGTON, Sept. 14.—The Shipping Board has offered for sale 92 steel steamers. Bids will be received on a private competitive basis following the failure to obtain satisfactory offers in open competition. The list includes many of the large steel cargo carriers as well as some of the smaller type.

Lionel B. Kavanagh, Standard Tool Co., Leominster, Mass., has purchased the F. H. Cook Co., celluloid and horn products machinery, the consideration being about \$65,000. The Cook company was established some thirty-five years ago.

The name of the Pittsburgh Pneumatic Co., Canton, Ohio, has been changed to the Canton Pneumatic Tool Co.

Safety Congress at Milwaukee

The ninth annual safety congress of the National Safety Council will be held in the Auditorium, Milwaukee, Wis., "the city which gave it birth eight years ago," from Sept. 27 to Oct. 1. A preliminary 56-page pamphlet announcing the program and giving other information has just been made ready for distribution. The pamphlet is unusually complete with facts pertaining to the comfort and convenience of those attending, such as hotel accommodations and facilities at the Auditorium. Among the features of entertainment are moving pictures, informal dinners, smokers and entertainment for the ladies. The annual banquet will be held Sept. 30. The steel, machinery and metal-working industries are well represented by speakers.

The metals section will meet at 9.30 a. m., Sept. 29, Sept. 30 and Oct. 1. The following are among the speakers: R. C. Salisbury, supervisor of safety, Interstate Iron & Steel Co., Chicago, on "Building a Safety Organization in a Foundry"; Frank Moffett, engineer National Malleable Castings Co., Cleveland, on "Personal Element in Safety from the Standpoint of the Foundry"; Nicholas Prakken, Pawling & Harnischfeger Co., Milwaukee, Wis., on "Safety Features of Overhead Electric Traveling Cranes from the Standpoint of Construction and Design"; L. A. Touzalin, assistant superintendent blast furnaces Illinois Steel Co., South Chicago, Ill., on "Safe Practices in Blast Furnace Operation"; J. C. Smith, Inland Steel Co., Indiana Harbor, Ind., on "Bonus System in Safety Work"; Philip Stremmel, superintendent hot mills National Enameling & Stamping Co., Granite City, Ill., on "No Bonus System in Safety Work"; Dr. Lucian Chaney, United States Bureau of Labor Statistics, Washington, on "Discussion of Foregoing Addresses." The concluding feature of these sessions will be a practical demonstration, entitled, "Fixing Responsibility for an Accident," depicting: *a*, the accident; *b*, first aid; *c*, investigation. It has been prepared by J. R. Mulligan, supervisor acci-

dent prevention and education, Bethlehem Steel Co., Bethlehem, Pa., and is staged by officers of the metals section.

Among the speakers at the session devoted to employees' publications on the morning of Sept. 29 are: Elmer Durgin, editor *The Case Eagle*, J. I. Case Threshing Machine Co., Racine, Wis., on "Getting Employees Acquainted with Each Other, with the Company's Officials, and with the Company's Products"; J. S. Huston, editor *Coke and Iron Monthly*, By-Product Coke Corporation, Chicago, on "How to Keep Your Contributors Enthusiastic"; Dr. Charles L. Ferguson, Cincinnati Milling Machine Co., Cincinnati, on "Best Method of Collecting Material"; Emmet O'Brien, editor *Feeds and Speeds*, Niles-Bement-Pond Co., Plainfield, N. J., on "What Should Appear on the Safety First Page"; Grover Kingsley, editor *The Melting Pot*, Halecomb Steel Co., Syracuse, N. Y., on "Selling Safety Through Printer's Ink."

At the A B C session, on Sept. 28, the following is a partial list of speakers: W. E. Worth, assistant manager, industrial relations department International Harvester Co., Chicago, on "The Essentials of a Plant Safety Organization"; G. T. Fonda, general supervisor of employment, compensation and welfare Bethlehem Steel Co., Bethlehem, Pa., on "How to Promote Safety Education in a Plant"; T. H. McKenney, supervisor of labor and safety Illinois Steel Co., South Works, South Chicago, Ill., on "Getting Results from Plant Safety Committees."

At the medical sessions on Sept. 29 the following are some of the speakers: Dr. William O'Neill Sherman, chief surgeon Carnegie Steel Co., Pittsburgh, on "Industrial Surgery"; Dr. A. W. Colcord, medical director Carnegie Steel Co., Clairton, Pa., on "Physical Examination of Employees."

The city of Milwaukee will observe "no accident week," coincident with the congress. Requests for room reservations may be made to J. C. Pinney, 108 Mason Street, Milwaukee, Wis.

Code of Ethics for Engineers

A committee of five of the American Society of Mechanical Engineers has drawn up a new code of ethics. The committee recommends that finally some code should be given to engineers of every branch of the profession and also to architects, whose work is closely associated with that of engineers. It believes that some professional body, such as the Engineering Council, should appoint a committee from all technical societies to prepare this proposed common code, but meanwhile the committee's own code referred to has been offered to the council of the society for consideration. This tentative code is given below.

The committee on the code recommends that the president of the society appoint a standing committee on professional conduct. To this committee would be referred cases of questionable ethical conduct on the part of members, and the committee would interpret the code in the light of these cases. The code committee believes that the council should have the power to censure by letter the conduct of a member if the breach is of minor character, or to cause the member's name to be stricken from the roll without publication, or to strike the member's name from the roll and to publish the facts in the case in the journal of the society.

The personnel of the committee on code of ethics is as follows: Prof. A. G. Christie, Johns Hopkins University, Baltimore, chairman; Robert Sibley, editor *Journal of Electricity*, San Francisco; John V. Mar, University of Minnesota, Minneapolis; H. J. Hinchen, tenis, associate professor of mechanical engineering, Atlanta, Ga., and Charles T. Main, Boston. The code:

1. The mechanical engineer should be guided in all his relations by the highest principles of honor, of fidelity to his client, and of loyalty to his country.

2. His first duty is to serve the public with his specialized skill. In promoting the welfare of society as a whole he advances his own best interests, as well as those of the whole engineering profession.

3. He should consider the protection of his client's or em-

ployer's interests in professional matters his essential obligation, if these interests do not conflict with public welfare.

4. He shall refrain from associating himself or continuing to be associated with any enterprise of questionable or illegitimate character.

5. He can honorably accept compensation, financial or otherwise, from only one interested party unless all parties have agreed to his recompense from other interested parties.

6. He must inform his clients of any business connections, interests or circumstances, such as might influence his judgment or the quality of his services to his clients.

7. He must not receive, directly or indirectly, any royalty, gratuity or commission on any patented article or process used in the work upon which he is retained without the consent of his clients or employers.

8. He should satisfy himself before taking over the work of another consulting engineer that good and sufficient reasons exist for making the change.

9. He must base all reports and expert testimony on facts or upon theories founded only on sound engineering principles and experience.

10. He must not regard as his own any information which is not common knowledge or public property, but which he obtained confidentially from a client or while engaged as an employee. He is, however, justified in using such data or information in his own private practice as forming part of his professional experience.

11. He should do everything in his power to prevent sensational, exaggerated or unwarranted statements about engineering work being made through the public press. Full descriptions of new inventions, processes, etc., for publication should be furnished only to the engineering societies or to the technical press.

12. He should not advertise in an undignified, sensational or misleading manner, or offer commissions for professional work, or otherwise improperly solicit it.

13. He should not compete knowingly with a fellow-engineer for employment on the basis of professional charges or attempt to supplant a fellow-engineer after definite steps have been taken toward the other's employment.

14. He should assist all his fellow-engineers by exchange of general information and valuable experience or by instructions through the engineering societies, the schools of applied science, and the technical press.

CALAMITY AVERTED

Vice-President of National Association Believes
There Will Be No Coal Shortage

WASHINGTON, Sept. 14.—As a result of the various measures taken by the Interstate Commerce Commission, railway executives and the coal operators the present situation warrants the prediction that the threatened coal shortage of next winter will be averted, according to J. D. A. Morrow, vice-president of the National Coal Association.

Mr. Morrow, in an address during the past week, stated that the acute shortages at points served through the Great Lakes and New England as well as the rest of the country are rapidly being made up. He said that the developments of the summer have demonstrated that the appointment of a fuel administrator as advocated in some quarters earlier in the season would not have been justified. Mr. Morrow reiterated his opposition to the proposed embargo on overseas export of coal.

"The nation is emerging from a crisis in its soft coal supply, which, until the last few weeks, threatened its whole economic life," said Mr. Morrow. "Only by bringing into play stupendous efforts on the part of the bituminous coal operators and the railroad executives, backed by the Interstate Commerce Commission, has a dire emergency been met, and an industrial calamity avoided."

Proposed Fuel Administration

"In the midst of the cry that ran throughout the country for more coal early in the summer there loomed up the possibility of the re-establishment of a fuel administration to handle the coal problem. The operators assured the White House of their confidence that the emergency would be met, in conjunction with the railroads. Justification for this attitude by the operators is found in the effective working out of the program as evolved between them, the railroads and the Interstate Commerce Commission.

"The plain fact is that a fuel administration could have accomplished nothing in the existing emergency that the operators and railroads could not do themselves. Being entirely a matter of more cars at the mines and priority shipments to territories in most need of coal, it essentially was a thing for the operators and the railroads to handle. It did not take them long to find a way, and, this done, it was only a matter of putting the scheme into practical operation."

Relative to an embargo on exports Mr. Morrow said:

"While much has been said of the advisability of putting an embargo on overseas exports of coal, the fact is that any such embargo would be highly impracticable. It has been demonstrated that, by the use of the facilities for tidewater transshipment of coal to New England, the needs of New England can be adequately met. The performance since the New England priority order went into effect has sufficiently demonstrated it.

"Coal operators naturally must stand ready to supply the home or domestic requirements of the United States ahead of overseas exports, but assuredly they ought not to be asked to withdraw coal from overseas export trade merely to give it to industries which will use it to manufacture products for overseas export. Manifestly that would involve a discrimination against the right of the coal operator to engage in export trade, while the privilege was enjoyed by others. The fact is that the shipments of overseas export coal has not in any way affected the shortage in the United States. If the New England industries had contracted for coal early in the spring, they would not have found themselves with any shortage."

Production of Coke Declines

The weekly report of the Geological Survey shows that the production of beehive coke continued to decline during the week ended Sept. 4. The total output was estimated on the basis of shipments originated by the 27 principal coke-carrying roads at 395,000 tons, a decrease when compared with the preceding week of 24,000 tons. The present rate of production is considerably less than that prevailing last year at this season. In the corresponding week of 1919, for example, the total output was 448,000 tons. The cumulative production since the beginning of the calendar year shows an increase over 1919 of about nine per cent.

Production of soft coal declined again during the week ended Sept. 4. The total output was estimated at 11,051,000 net tons, a decrease of 339,000 tons, or three per cent when compared with the preceding week.

The production of anthracite felt the effect of the strike which began on Sept. 2. The cars of anthracite loaded by the nine principal carriers during the week ended Sept. 4 totaled 21,103, which was a decrease of 14,285 cars, or 40 per cent when compared with the preceding week.

President Wilson during the past week sent a telegram to a committee of anthracite mine workers severely censuring the miners for striking in violation of the contract recently entered into under the terms of the award of the President's Anthracite Coal Commission. The President refused to reopen the wage award.

O. F. S.

INCREASE IN STEEL OUTPUT

Ingot Statistics for August Indicate a Total of
3,529,920 Tons

Steel ingot production in the United States showed a considerable gain in August. According to the

Monthly Production of Steel Ingots by 30 Companies Which Produced About 85 Per Cent of Total in 1919—Gross Tons				
	Open Hearth	Bessemer	All Other	Total
January, 1919	2,351,153	749,346	7,279	3,107,778
February	2,043,635	655,206	5,842	2,704,683
March	2,100,528	555,332	6,405	2,662,265
April	1,732,447	500,770	6,494	2,239,711
May	1,506,015	414,392	8,617	1,929,024
June	1,692,277	521,634	5,328	2,219,219
July	1,875,633	625,246	7,300	2,508,176
August	1,988,611	748,212	9,218	2,746,081
September	2,242,758	714,657	10,687	2,968,102
October	2,752,106	700,151	12,867	2,865,124
November	2,187,245	795,164	16,640	3,299,049
December	2,056,336	568,952	13,017	2,638,605
January, 1920	2,251,541	615,932	15,688	2,883,164
February	2,287,273	675,954	17,463	2,980,690
March	2,135,633	653,888	13,297	2,802,518
April	2,299,645	695,003	5,784	3,000,432

American Iron and Steel Institute statistics 30 companies which made about 85 per cent of the total in

1919 produced 3,000,432 gross tons last month. Assuming that the companies not reporting produced at a corresponding rate the August total for the country was 3,529,920 tons, or 135,740 tons per day, counting 26 operating days. The July output was estimated at 3,297,433 tons, or 126,824 tons a day. Thus the August output showed a gain of about 9000 tons per day over July, representing practically a return to the rate in June from which, due to railroad congestion, there had been a falling off in July.

The figures herewith from the last report of the American Iron and Steel Institute give separately the production of Bessemer and open-hearth steel ingots. Due to the steel strike, no statistics were gathered in the last four months of 1919. The figures represent the totals for 30 companies "which made about 85 per cent of the steel ingot production in 1919."

Will Double Capacity of Sharpsville Plant

The Sharpsville Boiler Works, Sharpsville, Pa., has announced plans which will double the present capacity of the plant. A fabricating plant is to be erected and new equipment will include the installation of three electric cranes.

ESTABLISHED 1855

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Better Freight Movement

It seems to be a safe estimate that the railroads are now carrying as large a volume of freight as at any time in their history. In the second week in August they broke the record for that particular week of the year, loading more cars than in the same week of 1918, when the record for the time was made. Since the middle of August there has been a continuance of the improvement in railroad conditions, and at a more rapid rate.

Traffic conditions may not be entirely satisfactory at the present time, and indeed they are not, but they are very much better than they were. If the rail situation was a serious drag upon business three months ago, the present situation is much less of a drag. Business, however, does not improve as a result of the change. Only superficially is that a paradox. When deliveries are uncertain men are disposed to overbuy. When deliveries become much freer they naturally tend to withdraw from the market. This does not prove that real business is stimulated by deliveries being curtailed or by being made difficult. The operations can be viewed only at long range. Business is stimulated by being conducted at low cost and it is expensive to carry unusual stocks as a safeguard against interruptions to receipts.

While the volume of freight handled has increased the expedition with which the freight is moved has also increased. The most trustworthy measure of the speed at which freight is moved is the relation between car loadings and the number of cars in service. There is still a larger proportion of cars out for repairs than there should be, while the total number of cars has not increased materially in several years, and the daily loading in proportion to the number of cars in service is much higher than at nearly all times in the past few years. Whatever individual cases of delays may be cited, this general average is the safest criterion. When nearly a million cars a week are loaded individual cases cannot have much to do with the average. This quicker dispatch tends to reduce the cost of doing business. To industry

in general it will be advantageous if the railroads get along with the smallest number of cars with which they can handle the traffic offered, for the smaller the number of cars the quicker the cars perform their individual tasks of moving material from consignor to consignee.

It must be distinctly regrettable to the great majority of the people that the much better movement of bituminous coal has not operated to bring the market price within something like reasonable bounds. The present price is an acute famine price when no real famine exists. The market price is dictated more by mental states than by the relation between supplies and requirements.

American Steel Treaters

The convention and exhibition this week in Philadelphia of steel-treating experts marks the culmination of an important feature of recent metallurgical progress. From unpretentious beginnings in Chicago just two years ago an organization has been formed which has local chapters in many steel consuming centers and a total membership of not less than 4000. Its interesting history was published in THE IRON AGE last week. It is remarkable that in so brief a time a technical society such as the American Society for Steel Treating should be formed, capable of successfully conducting a large convention and exhibition equal to the achievements of much older societies.

The explanation is not far to seek. The progress of events, though silent and under the surface, has been very rapid. Demand for quality steel in quantity has been more insistent in recent years and progressively so at a rapid rate. Aside from improvements in steel-making processes, in which electric furnaces are performing so important a rôle, there has developed the necessity for heat treatment of the steel, as made or fabricated, so as to bring out its best qualities. It is in most cases true that a steel is only as good as its heat treatment. The modern uses to which steel is put have intensified this movement as well as has the formidable array of alloy steels.

The result is that the heat treatment of steel

has developed from an art to a science, whether applied to tool or to other steels. In very few cases is the eye now relied upon to detect the proper degrees of heat for certain annealing, quenching or drawing operations. This is no longer possible, for many complicated alloy steels would thus be rendered unfit or the best in them not brought out. Here again electricity is a vital factor. It has made possible not only the detection accurately of the right temperature or exact critical points but it is also the agent which makes possible automatic treatment and hence the most reliable results.

As a consequence the field which this new society embraces is a wide one as well as most important. There are included not only heat-treatment processes and media, as well as the solution of heat-treatment problems, but also the many kinds of apparatus which are necessary, including pyrometers, furnaces, testing equipment and the like.

The problems already solved have been numerous. It is not unlikely that in the near future the successful commercial heat treatment of steel rails and of non-ferrous alloys will confer benefits not yet fully capable of measurement. New alloys are sure to result and greater efficiency of those now employed.

The Steel Corporation's Orders

An item of news that commands widespread attention is the August decrease of 313,430 tons in the United States Steel Corporation's "unfilled tonnage," for it is the first decrease reported since that for May of last year. For 14 consecutive months the unfilled tonnage had shown increases, ranging from 38,351 tons last July to 1,137,036 tons last December. The average increase in the 14 months was nearly half a million tons a month.

With an increase in July of 139,651 tons and a decrease in August of 313,430 tons there was a change from one month to the next of about 450,000 tons. The change was caused by increase in shipments and by decrease in new bookings, a third factor being a few cancellations of old orders, some of them in the export trade, which is naturally affected occasionally by sudden political changes.

At the end of August the Steel Corporation's "unfilled tonnage" amounted to 10,805,038 tons. On account of the circumstances attending its booking this tonnage is of particularly sound character. The corporation was in position to pick and choose in making its sales. The "sales" were largely in the nature of allotments, for many consumers draw part of their supplies from the Steel Corporation and part from one or more of the independent producers. These buyers have probably bought considerably farther ahead from the Steel Corporation than from the independents, and should their monthly requirements fall off the business placed with the Steel Corporation would not need to be scaled down.

The last annual report of the Steel Corporation makes it evident that the corporation's rating of its capacity, in terms of the steel products as sold to outsiders, is about 16,200,000 tons a year, or 52,500 tons per working day. Divided into the

unfilled tonnage just reported this gives the equivalent of 206 working days. Taking operation at 90 per cent of capacity, which seems to be a reasonable enough guess for these uncertain times, the equivalent is 230 working days or just nine months. This, of course, is purely an average period, for the orders are not evenly distributed among the various departments, and in a given department some of the orders are for more extended delivery than others.

So far as concerns domestic cancellations, it is probable that nearly all are due to the falling off of steel consumption for automobiles. It might be assumed that the Steel Corporation would get relatively few cancellations, seeing that its prices are considerably lower than those of the lowest priced independent producer and far lower than those of some of its competitors. It is quite possible, however, that the Steel Corporation is carrying on its books orders that will yet be canceled, in spite of the fact that on the score of price the buyer might be expected to keep them alive. It is well known that there has been duplicate and triplicate buying in the effort of manufacturing consumers to make sure of deliveries of steel for work which they had under contract. Some buyers who had steel coming to them on contracts placed with the Steel Corporation, being unable to get the steel as needed, went into the market and paid considerably higher prices for assured deliveries. It was also the case that customers of independent steel companies, unable to get deliveries when wanted, went to other independents and paid higher prices because at the higher prices prompt deliveries could be had. In such cases the product in which this steel was to be used has been made up and shipped, and the need for the particular sizes and character of material having passed, nothing remains but to cancel the original order whether it be on the Steel Corporation's books at the lowest current price or on an independent company's books at an intermediate price. The extent to which such tonnages will figure in the readjustment now under way is entirely conjectural, but as a factor in the situation growing out of the double and triple standards of prices maintained in the past 15 months they are not to be ignored.

The Rate of Steel Production

Barring last February and March, the rate of steel ingot production shown for August is the largest since the beginning of 1919. This indicates the extent of the recovery from the influences of the outlaw rail strikes that began April 1, but suggests also that the recovery was not complete in August. The August rate of ingot production was approximately 42,700,000 gross tons a year, this comparing with the rate of about 45,200,000 tons attained last March. Allowance must be made, however, for the fact that March is normally a record breaking month, on account of weather conditions, while August is always a relatively poor month. The particularly significant thing is that from July to August, both midsummer months, there was an increase of 7 per cent.

This is chiefly a reflection of improving rail traffic conditions and therefore a further increase for this month and next is to be expected. It is not improbable that October will not only pass the rate of last March but will also break the record of all time, made in October, 1918, and only slightly exceeding the rate of last March.

Doubtless the steel trade would like to see the establishment of such reasonably favorable manufacturing conditions as would afford an opportunity to test the steel-making capacity of the country. There has been no such test since 1916, for since late in that year one thing or another has prevented the mills from producing with the facility that characterized their operations in 1916 and at such previous times as the state of order books permitted the attempt to operate full. As matters stand, only a rough guess can be made as to present "capacity" under fair working conditions such as used to obtain. Based on 1916 production, with moderate allowance for new construction, the ingot capacity has been set at 50,000,000 tons. But in view of actual production during the first six months of this year having been at the rate of fully 42,000,000 tons, under severely adverse conditions, one is disposed to conclude that more than 50,000,000 tons could be made with reasonably favorable conditions. At 50,000,000 tons capacity, the August production rate was 85 per cent, while if the August production was at an 80 per cent rate the capacity is 53,400,000 tons. Even with the best possible data, however, the capacity can never be precisely stated, mills exhibiting such vagaries of falling down at one time and of breaking records in surprising manner at another.

In August the production of finished rolled steel was probably in approximately the usual proportion to ingot production, statistics having shown this relation to be about 76 per cent. It should be remembered, however, that previous to August the mills had not finished all their ingots, finding it necessary on account of car shortage and large stocks of finished goods to leave some of their steel in semi-finished form. The rolling of this accumulation as opportunity presents itself will augment somewhat the output of finished steel in the next few months in proportion to the current ingot output.

Preplanning in Industrial Plants

If preplanning of extensions to industrial plants needed any justification it is found in a marked degree in the case of the Gary works of the Indiana Steel Co. The war time extensions of these properties of the United States Steel Corporation are reviewed elsewhere in this issue, and the point is made early in the account that, with due allowance for labor, weather, transportation and other obstacles which the entire country had to surmount in the call for war materials, fully 50 per cent increase in productive capacity was secured by following lines laid down at the inception of the works.

It sometimes happens that radical changes in processes or in equipment throw original plans into the discard. Unnecessarily large space in some one direction may have been provided, or it may be that the allotted space has proved inade-

quate. The introduction of the steam turbine for central power stations is a case in point. Much greater prime mover capacity in steam turbines may be grouped in the space formerly necessary for a relatively small amount of power generators, and the case is recalled wherein a writer eloquently dilated on the immensely increased power generating capacity which the walls of a given power station would encompass, without realizing that the auxiliary equipment, even though much of it could be disposed at another level, took up space much greater than the cubic contents of the prime movers themselves.

It is true that practically every going industrial company, when it takes up the problem of adequate manufacturing facilities, provides for physical expansion in a way not to interfere with departmental relations or the continuity of the manufacturing processes. But what the Gary plant illustrates conspicuously is the wisdom of preplanning, even when the necessity for enlargement seems to lie in the vague future.

Molybdenum Steels

There are indications that molybdenum is to play an important rôle in the future of alloy steels. Extensive studies of the effects of its addition to alloy and carbon steels have been made in the past two years. The experiments have been carried out on a large scale and the use of the metal as an alloy may be said to have reached the commercial stage.

Molybdenum as a metal has been known for many years. Much has been said about its efficiency, or lack of it, in high speed steels, but the new developments referred to do not include the grade so used. Molybdenum cannot be compared with vanadium as a new metal when the latter was first given prominence. It would appear that supplies of molybdenite are now assured in abundance and that the manufacture of a uniform ferromolybdenum is established.

From the data published the use of molybdenum in conjunction with nickel, chromium, vanadium, and other metals or as a simple alloying element, confers on the resulting products more pronounced forging and machining properties, as well as increased strength and toughness, the additions in each case displacing a certain proportion of the other alloying metals, with little difference in cost. Some advantage on this score is even claimed. But the most important advantage is the effect on the responsiveness to heat treatment. Steels containing molybdenum are capable of heat treatment within a much wider temperature range than some of the same steels without molybdenum. In certain cases the static and dynamic properties thus obtained are superior.

The heat treatment feature of these new steels is important. That proper results are made more certain is of consequence, but the fact that heat treatment has recently developed into an art widely practiced, as signalized by the convention and exhibition this week in Philadelphia, suggests the larger rôle of the new steels in the near future, particularly in the building of automobiles and aeroplanes.

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Iron and Steel Markets

MARKETS ARE QUIETER

Railroads Buy Chiefly for Repairs, but Rail Orders Are Pending

Some Signs of Overbuying—Larger Steel Output and Better Car Movement

Following the check given to buying by the recession in the automobile industry, the steel market has been drifting into quieter times. No new influences are yet recognized that promise an early return of activity, and both buyers and sellers look to the later weeks of the year to clear up the present widespread uncertainty as to prices.

The cancellations of finished steel by automobile manufacturers, as reported from time to time in the past two months, have made little or no impression upon the crowded order books of the mills, but each week is bringing out new cases of curtailment in foundry and other metal-working operations due to the holding up of machinery orders placed by automobile factories or by plants making parts or equipment for them.

The economical policy of the railroads is made clearer by the large amount of work set on foot in the repair of tracks, cars and locomotives. Steel companies are getting track supply orders, and car and locomotive works are busy on old rolling stock, but new rail and equipment orders wait.

However, in the East 100,000 tons of rails for the B. & O. and 15,000 to 20,000 tons for the Norfolk & Western are under consideration, and a number of roads are placing quotas on the Steel Corporation's books. In the West the Santa Fe is expected to buy 120,000 tons, while the Illinois Central has made reservations for 60,000 tons. Present indications are that 800,000 to 1,000,000 tons will be ordered by Western roads, though something will depend on the price.

A recent Chicago inquiry for 5000 cars came from the Consolidated Railway Equipment Corporation, organized by short line railroads, which with the help of the Government expects to buy \$20,000,-000 worth of cars and locomotives.

Agricultural implement makers are seeking steel bar contracts for the first half of 1921. For filling fourth quarter needs this industry has paid 4c., Pittsburgh. The easing up in general demand is shown by a Pittsburgh district mill offering large sizes in two or three weeks.

The lower tendency of plate prices has been in evidence for several weeks, but 3.25c., Pittsburgh, seems for the present the limit of concessions.

One of the suspended orders from the automobile trade was for 2000 tons of forging steel for axles. Fair sized if not large stocks in the hands of automobile builders and gradually improving mill deliveries seem to preclude any notable buying this year from that industry.

Blue annealed sheets in the heavier gages are freely quoted at 5.25c. On black sheets as low as 7c., Pittsburgh, has been done and a like tendency is seen in galvanized.

The country's steel ingot production in August

proves to have been about 3,500,000 tons, or at a yearly rate of more than 42,500,000 tons. There was a gain of about 9000 tons a day upon July operations, which meant practically a return to the production rate of June.

Better car movement appears in every direction, but weeks of strenuous work are ahead, so large is the volume of overdue deliveries.

Evidence of overbuying in steel is not lacking. On some contracts written at the bottom prices no material has been requisitioned, with the result that monthly allotments not called for will automatically be removed from order books.

With the exception of foundries which make automobile castings, few meltters are asking for suspensions of pig iron shipments, but there is some reselling of iron, especially in the Chicago district. Sellers have had little difficulty in diverting to other buyers iron not taken for automobile castings. Copper-free low phosphorus iron has been marked up \$3 at Chicago, but this is an exception and the general tendency of prices is toward lower levels, although quotations are being maintained for the most part. Buying is very limited and inquiries are not numerous. The largest tonnage pending is 5000 tons of Bessemer for a New York State company.

Stocks of merchant iron in Alabama furnace yards decreased 30,000 tons in August, amounting roundly on Sept. 1 to 100,000 tons, of which foundry iron was under 90,000 tons.

The scrap market has developed weakness in nearly all leading centers and most grades have been reduced from 50c. to \$1 per ton. The Philadelphia market is an exception, showing several advances in spite of limited transactions.

New cross currents in the international trade situation are noted. At the very time Belgian works are cutting prices, British northeastern steel makers have advanced steel £1 per ton. Foundry iron of Japanese origin is offered on the Pacific Coast at \$60 per ton and steel bars purchased some months ago at 2.35c. per lb., Pittsburgh basis, for export, have been successfully placed with Western buyers in the United States.

Pittsburgh

PITTSBURGH, Sept. 14.

The market in iron and steel still is in the throes of the dullness which began to develop first as a result of the slump in the automobile industry, and latterly because of improved deliveries against old contracts, due to the betterment in the railroad transportation situation. There now appears to be little urgency in the demand for any kind of finished steel unless it possibly be in nails and other common wire products. The shortage of tin plate has not been relieved, but makers have supplied to the best of their ability the requirements of the perishable food container manufacturers, and pressure for early supplies hardly is as great as it was recently. The inactivity, however, has so far found less reflection in prices than in the fact that there is greater willingness on the part of producers to consider demands which a few weeks ago they might have been inclined to refuse on account of

A Comparison of Prices

Advances Over the Previous Week in Heavy Type, Declines in Italics

At date, one week, one month, and one year previous

For Early Delivery

Pig Iron, Per Gross Ton:	Sept. 14.	Sept. 7.	Aug. 17.	Sept. 16.
	1920	1920	1920	1919
No. 2 X, Philadelphia†	\$53.51	\$53.51	\$52.90	\$30.60
No. 2 Valley furnace†	50.00	50.00	50.00	26.75
No. 2 Southern, Cin'tif.	46.50	46.50	45.60	31.10
No. 2 Birmingham, Ala.†	42.00	42.00	42.00	27.75
No. 2 foundry, Chicago*	46.00	46.00	46.00	26.75
Basic del'd, eastern Pa.	51.26	51.26	48.30	26.60
Basic Valley furnace	48.50	48.50	48.50	25.75
Bessemer, Pittsburgh*	50.46	50.46	48.40	29.35
Malleable, Chicago*	46.50	46.50	46.50	27.25
Malleable, Valley	50.00	50.00	50.00	27.25
Gray forge, Pittsburgh	50.96	50.96	50.40	27.15
L. S. charcoal, Chicago	58.50	58.50	57.50	32.75

Rails, Billets, Etc., Per Gross Ton:	Sept. 14.	Sept. 7.	Aug. 17.	Sept. 16.
	1920	1920	1920	1919
Bess. rails, heavy, at mill	\$55.00	\$55.00	\$55.00	\$45.00
Oh. rails, heavy, at mill	57.00	57.00	57.00	47.00
Bess. billets, Pittsburgh	60.00	60.00	60.00	38.50
Oh. billets, Pittsburgh	60.00	60.00	60.00	38.50
Oh. sheet bars, P'gh.	67.50	68.00	68.00	42.00
Forging billets, base, P'gh.	75.00	75.00	80.00	51.00
Oh. billets, Philadelphia	65.74	65.74	69.10	42.50
Wire rods, Pittsburgh	75.00	75.00	75.00	52.00

Finished Iron and Steel,

Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Iron bars, Philadelphia	4.85	4.85	4.75	2.745
Iron bars, Pittsburgh	4.75	4.75	4.75	2.75
Iron bars, Chicago	3.75	3.75	3.75	2.62
Steel bars, Pittsburgh	3.25	3.25	3.25	2.35
Steel bars, New York	4.13	4.13	4.02	2.62
Tank plates, Pittsburgh	3.25	3.25	3.25	2.50
Tank plates, New York	3.63	3.63	3.52	2.77
Beams, etc., Pittsburgh	3.10	3.10	3.10	2.45
Beams, etc., New York	3.48	3.48	3.27	2.72
Skelp, grooved steel, P'gh.	3.25	3.25	3.25	2.45
Skelp, sheared steel, P'gh.	3.50	3.50	3.50	2.65
Steel hoops, Pittsburgh	5.50	5.50	5.50	3.05

*The average switching charge for delivery to foundries in the Chicago district is 70c. per ton. †Silicon, 1.75 to 2.25. ‡Silicon, 2.25 to 2.75.

The prices in the above table are for domestic delivery and do not necessarily apply to export business.

the condition of their order books. Quoted prices of independent makers on bars and plates in most cases are well above what they will actually accept where attractive tonnages are involved. As a whole, it may be said that the steel market is weaker to the extent that peak prices in all lines have disappeared.

The general asking price of most independent makers of merchant steel bars is 3.50c., but the largest sale recently reported, one of 2000 tons for delivery over the remainder of the year, was at 3.25c. The same difference exists between asking and selling prices of plates. Dullings of the edge of the demand for sheets has been accompanied by some recession from the recent high points. The largest recent transaction in black sheets, which involved 1000 tons for early delivery, was at 8c., and sales carrying higher prices were for comparatively insignificant quantities. Buyers requiring any considerable tonnage of blue annealed sheets would not have to travel far to secure them at around 5.50c. base.

A further decline is observed in the steel works grades of scrap material and furnace coke prices, although still relatively high, show another drop of 50c. per ton since a week ago. It is not possible to make any change in pig iron quotations, but the market is plainly softer in tone since the demand is extremely limited, and offerings at least of basic grades are comparatively large. At least two steel companies have basic iron for sale.

The railroad transportation situation, although far from normal, no longer occasions the anxiety it did a short time ago. While complaints are heard here and there of shortage of one kind of equipment or another, it must be said that in general the movement of material to and from the plants is fairly satisfactory. About the only important interest in this district that is not matching production by shipments, or, in other words, is adding to its accumulations, is the National Tube Co. This company has all of its plants in operation and the fact that it is piling, is in part due to the

Sheets, Nails and Wire,	Sept. 14.	Sept. 7.	Aug. 17.	Sept. 16.
Per Lb. to Large Buyers:	1920	1920	1920	1919
Sheets, black, No. 28, P'gh.	7.50	7.50	7.50	4.35
Sheets, galv., No. 28, P'gh.	9.00	9.00	9.00	5.70
Sheets, blue an'l'd, 9&10.	5.50	6.00	6.00	3.55
Wire nails, Pittsburgh	4.25	4.25	4.25	3.25
Plain wire, P'gh.	3.75	3.75	3.75	3.00
Barbed wire, galv., P'gh.	4.45	4.45	4.45	4.10
Tin plate, 100-lb. box, P'gh.	\$9.00	\$9.00	\$9.00	\$7.00

Old Material, Per Gross Ton:

Old Material, Per Gross Ton:	Sept. 14.	Sept. 7.	Aug. 17.	Sept. 16.
Per Lb. to Large Buyers:	1920	1920	1920	1919
Carwheels, Chicago	\$37.00	\$38.00	\$38.00	\$24.00
Carwheels, Philadelphia	43.00	42.00	40.00	24.50
Heavy steel scrap, P'gh.	28.50	29.50	29.00	19.00
Heavy steel scrap, Phil.	26.50	26.50	26.00	18.50
Heavy, steel scrap, Ch'go.	24.50	26.00	25.00	18.50
No. 1 cast, Pittsburgh	42.00	42.00	41.00	23.50
No. 1 cast, Philadelphia	40.00	40.00	39.00	25.00
No. 1 cast, Ch'go (net ton)	37.50	35.00	36.00	23.50
No. 1 RR. wrot, Phila.	34.00	33.00	33.00	26.50
No. 1 RR. wrot, Ch'go (net)	24.00	24.50	24.50	19.00

Coke, Connellsville,

Coke, Connellsville,	Per Net Ton at Oven:	Sept. 14.	Sept. 7.	Aug. 17.	Sept. 16.
Per Net Ton at Oven:	1920	1920	1920	1919	
Furnace coke, prompt	\$16.50	\$17.00	\$17.50	\$4.60	
Furnace coke, future	14.00	14.00	14.00	4.75	
Foundry coke, prompt	17.50	18.00	18.50	6.00	
Foundry coke, future	14.00	14.00	14.00	5.75	

Metals,

Metals,	Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
	1920	1920	1920	1920	1919
Lake copper, New York	18.75	18.75	19.00	23.00	
Electrolytic copper, N. Y.	18.75	18.75	19.00	22.50	
Zinc, St. Louis	7.80	7.90	8.00	7.15	
Zinc, New York	7.80	7.90	8.35	7.50	
Lead, St. Louis	8.25	8.62½	8.87½	6.00	
Lead, New York	8.37½	8.50	9.12½	6.25	
Tin, New York	45.00	45.00	48.00	56.50	
Antimony (Asiatic), N. Y.	7.12½	7.00	7.00	8.50	

comparatively full engagement of capacity. Easier fuel conditions are bringing about enlarged steel plant and blast furnace activities in the Mahoning and Shenango valleys. In that district, 33 out of 46 blast furnaces are in operation.

Ordinarily the statement of the United States Steel Corporation on unfilled tonnages does not attract wide attention, but the figures for last month, showing a loss of 313,000 tons, is viewed with much significance as giving a fairly clear picture of the developments of the past month in the steel industry.

Pig Iron.—Quotations are unchanged from those of a week ago and the general situation is without new features, unless the appearance of a few inquiries for third quarter of 1921 delivery, which are looked upon merely as "feelers" may be thus regarded. The Atlas Crucible Steel Co., Dunkirk, N. Y., has scattered broadcast an invitation for bids against 5000 tons of Bessemer iron for first quarter delivery and it is reported that some Pittsburgh district melters have asked for prices on basic for shipment during that period. Those producers who have quoted against these inquiries have named the present prices, but so far no business has developed. Prompt demands for the steel making grades practically have ceased with the improvement in shipments brought about by the better railroad situation. Occasional sales of foundry iron for early delivery are being made, but in all cases only small tonnages are involved and those are usually at \$50 Valley furnace for No. 2 grade. New orders from the foundries are much fewer than they were a while ago, and the tendency is to string out present bookings so that the plants may be kept running over the remainder of the year. This condition particularly is true of the foundries engaged in making automobile castings. Low phosphorus copper free iron is held at \$60 Valley furnace, but only small sales are taking place at that figure. It is reported, however, that the American Steel & Wire Co. recently closed for 4000 tons of this grade,

at \$60 f.o.b. the furnace of the Northern Iron Co., Standish, N. Y.

We quote Valley furnace, the freight rate for delivery to the Cleveland or Pittsburgh district being \$1.96 per gross ton:

Basic	\$48.50
Bessemer	48.50
Gray forge	49.00
No. 2 foundry	50.00
No. 3 foundry	49.50
Malleable	50.00

Ferroalloys.—Extreme dullness still characterizes the market here in all ferroalloys, and prices merely are nominal in the lack of important transactions. The asking price on 76 to 80 per cent ferromanganese is \$170, tidewater, for either English or domestic material, but there is not much doubt that buyers could obtain supplies for less if they were inclined to make firm offers. Consumers are getting good deliveries against their contracts and therefore are not interested in further supplies at the moment. To interest them, it would be necessary either to cut the price or raise the manganese content. The market in spiegeleisen is practically dead, and quotations of \$82.50 and \$85.00, furnace, quoted by the leading producers for average 20 per cent material, have no basis in sales. Maintenance of these figures is doubtful in view of the fact that ferromanganese is much cheaper at present. Almost nothing is going on in 50 per cent ferrosilicon, and in spite of higher asking prices, it is believed the buyers seeking tonnages of any consequence easily could obtain them at less than \$80 furnace, freight allowed. We note small sales of 15 per cent electrolytic ferrosilicon at \$56, delivered, Pittsburgh. Nothing recently has been done in blast furnace ferrosilicon in this market.

We quote 76 to 80 per cent domestic ferromanganese \$165 to \$170, seaboard, for either prompt or deferred shipment; the same prices are being quoted by English makers. We quote average 20 per cent spiegeleisen at \$80, furnace and 50 per cent ferrosilicon at \$75 to \$80, furnace, freight allowed. Bessemer ferrosilicon is quoted f.o.b. Jackson County and New Straitsville, Ohio, furnaces as follows: 9 per cent, \$66; 10 per cent, \$69.50; 11 per cent, \$72.80; 12 per cent, \$76.10. Silvery iron, 6 per cent, \$56.50; 7 per cent, \$58; 8 per cent, \$60; 9 per cent, \$62; 10 per cent, \$64.50; 11 per cent, \$67.80; 12 per cent, \$69.80. The present freight rate from Jackson and New Straitsville, Ohio, into the Pittsburgh district is \$4.06 per gross ton.

Billets and Sheet Bars.—The open market in billets and sheet bars has been extremely quiet in the past week, and while this has not produced any further weakening in prices, buyers still note rather liberal offerings of both forms of steel. Open hearth sheet bars are quotable from \$67.50 to \$70.00, Pittsburgh or Youngstown, but only those makers who need cash more than they do the steel are quoting less than \$70 at present. A price of well under the lower figure recently was named by one maker against a round lot tonnage for early shipment for cash. Rerolling billets of standard dimensions still are quotable from \$60 to \$65, Pittsburgh or Youngstown, but the fact that merchant mill products are not salable at such fancy prices as recently prevailed makes for a less active demand and little business recently has been done at as high as \$65. The Carnegie Steel Co. is operating between 75 and 80 per cent of its steel work capacity, and Youngstown independents are running about 80 per cent full. Shipments from both Pittsburgh and Youngstown are a little freer than they were a few weeks ago. Only a moderate demand is noted for forging billets, and prices are not extremely strong. The only sale noted is of a small tonnage for early delivery at \$80, but it is admitted that this is somewhat higher than would be demanded from regular customers of the maker doing the business.

We quote 4 x 4-in. soft Bessemer and open-hearth billets at \$38 to \$65; 2 x 2-in. billets, \$42 to \$70; Bessemer sheet bars, \$42 to \$65; open-hearth sheet bars, \$42 to \$70, and forging billets, ordinary carbons, \$75 to \$80 base, all f.o.b. Youngstown or Pittsburgh mill.

Wire Rods.—Coincident with its recent revision of extras on nails and wire, the American Steel & Wire Co. advanced its price of wire rods from \$52 to \$57 for the base size of common soft rods. The company is making no contracts in rods even at the higher price and is accepting orders subject to its ability to roll. Independent makers still are quoting \$80 against new inquiries from occasional customers, but \$75 appears to be maximum against shipments to those classified as regular customers. Prices are given on page 747.

Plates.—Demand remains at low ebb and while independent makers tenaciously are holding to 3.50c., Pittsburgh, as a base, it is not denied that 3.25c. would be accepted on an order involving 1000 tons or more. Such inquiries, however, are not common as the fabricating interests and the car building companies in this district are not crowded with business. Practically the only business coming to the latter from the railroads is repair work and industrial car buying has not been active for several weeks. The railroads still lack funds, for the recent payment by the Government was only 25 per cent in cash and 75 per cent in notes.

We quote sheared plates of tank quality, $\frac{1}{4}$ in. and heavier for early delivery from independent mills at 3.25c. to 3.50c., Pittsburgh. The Carnegie Steel Co. still quotes 2.65c. and is accepting business at that figure, but is not guaranteeing early delivery.

Structural Material.—The American Bridge Co. has taken 1200 tons for a bascule bridge for the Detroit, Toledo & Ironton Railroad over the River Rouge at Detroit. The same company has been awarded steel for a new building of the Union Gas & Electric Co., Cincinnati, which will take between 400 and 500 tons. These awards constitute the only important ones recently placed with fabricating companies in this district. In general, inquiries and awards run to small figures and competition, even for such business, is sharp. The tendency of investors either is to postpone indefinitely their projects or to seek new bids against those on which they have already been quoted. Most of the shops have a fair amount of business before them, but still are having trouble moving finished material, and this militates against full operations since it does not permit of any reduction of accumulated piles. The market in plain material is dull and rather soft. Prices are given on page 747.

Iron and Steel Bars.—Any strength the market in merchant steel bars may have at present is due less to the size of the current demand than to the fairly well sold up condition of the mills. Few of the independent companies are inclined to take on new business in the smaller sizes and the Carnegie Steel Co. also is heavily committed in this class of material. In the larger sizes practically all companies can take business for delivery over the remainder of the year. Any business recently done by independents at a price higher than 3.50c. was for a small tonnage and for delivery in the next four to six weeks. One large buyer in the district reports having placed 2000 tons for delivery between now and the end of the year at 3.25c. No change is noted in iron bars, but the firmness of the market is explainable more from the sold up condition of makers and the high cost of puddling than because new demands are heavy or urgent.

We quote steel bars rolled from billets at 2.35c., this being the price of the Carnegie Steel Co. for very indefinite delivery, likely not before first quarter of next year. Other mills rolling steel bars from billets quote from 3c. to 3.50c. at mill, prices depending entirely on the buyer and the delivery wanted. We quote reinforcing bars, when rolled from billets, at 3.75c. to 4c., and from old steel rails at about 3.50c. at mill. We quote common iron bars at 4.75c. and refined iron bars at 5c. to 5.50c. in carloads, f.o.b. mill, Pittsburgh.

Wire Products.—Manufacturers in this district are experiencing no relaxation in the demand for nails and other common wire products, and generally report that they are getting all the tonnage they care to accept. In most cases new bookings are being kept down to the proportion of completed orders. The Pittsburgh Steel Co., effective Sept. 10, has issued a new card of extras on cement coated nails. This card varies somewhat from those employed by other companies, naming rather stiff extras on nails of 12 pennyweight and heavier. No two companies now are quoting identically the same extras on coated nails. No change is noted in base prices of bright nails and wire, but it is understood that a number of manufacturers are not satisfied with the present extras for size on wire, and that some of them are considering a new card that would be more equitable.

We quote wire nails at \$3.25 base, as the price of the American Steel & Wire Co. and \$4.25 to \$4.50 by independent mills. We quote bright basic wire at \$3, the price of the American Steel & Wire Co. and \$3.75 to \$4, the price range of the independent mills.

Nuts, Bolts and Rivets.—The new list of discounts recently issued by one of the larger makers here has not yet been adopted by other makers, but this is due to the fact that the latter have little or no tonnage available for delivery over the remainder of the year. The new discounts apply only against orders calling for early delivery. Some makers of track bolts are quoting nose of 5/16 in. and smaller on the machine bolt base. Prices and discounts are given on page 747.

Hot-Rolled and Cold-Rolled Strips.—Although cancellations and suspensions of tonnages incident to the slump in the automobile industry are said to involve comparatively small tonnages, it is noted that some makers who were well sold up over the remainder of the year, prior to the decline in the demand, recently have been accepting some business for early shipment. It also is observed that such sales now are not taking place at higher than 5.50c. base for hot rolled, and 8.50c. for cold-rolled strips. A few weeks ago there was some talk of the possibility of all makers going to 6c. and 9c. respectively, but apparently there has been a revision of price ideas as a result of the tapering off in the demand. Some of the automobile companies still are buying small tonnages and occasional releases against suspended shipments are being made, but taking the market by and large, it is a quiet one, both as regards shipments and new demand.

Cold-Finished Steel Bars.—The real effect of the decline in the automobile industry now is being felt in cold-finished steel bars, demand for which is extremely small by comparison with that of a month or six weeks ago. While the tendency is to describe cancellations as not forming an important part of the whole production, it cannot well be denied that the automobile industry is the most important source of outlet for this kind of steel, and the cancellations have had the effect not only of taking the snap out of trading, but also of wiping out premium prices. Those makers who are not covered by contract on hot-rolled bars and are dependent upon the open market for supplies, still are quoting 6c., base, but those more favorably situated with regard to hot-rolled bars are quoting 4.10c. to 4.25c., and are taking on more business at these figures than they could a short time ago.

Hoops and Bands.—The independent market still is firm at 5.50c., base, but the maintenance of this price is due to the fact that makers have enough business on their books and are not seeking orders. New demands are few and small. The Carnegie Steel Co. continues to accept business for rather indefinite delivery at 3.05c.

Iron and Steel Pipe.—No special change is noted, either in prices or in general conditions. The National Tube Co. is operating practically all of its plants in full, but is piling more of its production than it is shipping. Independents in this district and in Youngstown are making a fairly good showing, both as regards mill operations and shipments, but all are still far behind their orders and jobbers are exerting a good deal of pressure for shipments. A new composite oil country pipe card, patterned after that of the National Tube Co., has been issued by the independent companies. Prices and discounts are given on page 747.

Sheets.—The past fortnight has been marked by a considerable expansion in sheet mill operations and better delivery incident to this improvement, as well as the less urgent demand from the automobile industry, has resulted in somewhat less pressure for early tonnages. All makers are one to four months behind in their monthly quotas, but the maintenance of present steel supplies and operating conditions would mean considerably less of a carry-over from this year into 1921, than was estimated a short time ago. In some finishes, manufacturers are likely to complete present obligations before the end of the year. This development has found reflection in a little more willingness on the part of some manufacturers to take on new orders, and these at less money than recently was demanded. Fourth quarter bookings of one independent maker in black sheets were at 7c. base, and of another at 7.50c. The largest spot sale of these sheets recently

made was one of 1000 tons at 8c. This price measures maximum and some of the newer companies have been taking business at 7.50c. Makers are having some trouble now in selling the heavier grades of blue annealed sheets for early delivery at higher than 5.50c. base. Mill operations are estimated at higher than 80 per cent of capacity. Prices are given on page 747.

Tin Plate.—The market has taken on a somewhat quieter appearance due to the fact that the packing of perishable foods for this season largely is over and the demand for tin plate for this purpose consequently has tapered. This development makes possible the giving of more attention by manufacturers to the demands from other sources. These requirements are large, for they have been sidetracked to a considerable extent, for perishable container needs, and the last quarter of the year ordinarily is a quiet one in the tin plate mills. This year promises to be an active period in the making up and shipping of general line tin plate. Decline in the automobile demand has resulted in a somewhat easier situation in long tennes, one of the big uses of which is in the manufacture of automobile gasoline tanks. Better supplies of steel and improved railroad transportation conditions are reflected in increased mill operations. Prices do not change much, but the American Sheet & Tin Plate Co. probably will complete its present obligation earlier in 1921 than was expected a short time ago, and this would make the company more of a factor in prices in first half tonnages than it otherwise would be.

We now quote tin plate to domestic consumers for remainder of the year delivery at \$7 to \$9 base box; stock items \$9 to \$10, and for export \$11 to \$12 per base box, all f.o.b. Pittsburgh.

Coke.—So irregular are the car placements in the Connellsville region that the beehive oven coke market is extremely erratic, and price tendencies rarely are in the same direction for as long a period as 24 hours. On Saturday sales were made of spot furnace coke as low as \$16.50 per net ton, oven, and there were fairly liberal offerings yesterday and to-day at \$17. On the experiences of the past few days, the market would be quotable from \$16.50 to \$17, but prior to Saturday, on account of rather poor car allotments, and good buying by furnace interests in St. Louis, Cincinnati and Chicago, \$17.50 and even more was being obtained by some producers. These operators even this week regard \$17.50 as a minimum price on standard furnace fuel, and are inclined to believe that so long as coal can be sold at \$9 and \$10 per ton, at mines, the likelihood is slight of a sharp break in prices. The recent adjustment of coal mine and coke oven labor wages made by the H. C. Frick Coke Co. and followed by other companies in the Connellsville district, it is figured, will add from 40c. to 50c. per ton to the cost of making coke. Few producers yet are shipping 100 per cent against contracts and, between the attempt to catch up with these obligations and the spot demands from outside points, accumulations in the region are small. Spot foundry coke is quotable from \$17.50 to \$18 generally, but selected 72-hr. fuel is not plentiful under \$18.50. The contract market is at a standstill. Some blast furnace interests might pay as much as \$14 for last quarter tonnages, but producers appear unwilling to sell at that figure because it is realized that if the market holds at all well during the remainder of the year, they could make more money by spot sales, while if prices fell under \$14, buyers would hold up shipments. First half of 1921 requirements are not being much considered, pending the more settled market in pig iron.

Boiler Tubes.—Demands are not nearly as numerous or insistent as they were five or six weeks ago. This condition is declared to be due entirely to the fact that boiler makers cannot guarantee specified deliveries, and those contemplating power houses are disinclined to close, owing to lack of definite information in this regard. All makers have good-sized bookings, particularly of stationary boiler tubes, but are not heavily provided with business in locomotive boiler tubes. Prices are extremely irregular and take a wide range as independent makers are quoting discounts closely in keeping

with their individual costs and their ability to make shipments. Discounts are given on page 747.

Steel Rails.—Good demand is coming out for small tonnages of standard rails for early delivery from railroads tributary to the Pittsburgh district, but such business is not easily placed, as the Carnegie Steel Co. is sold ahead for the remainder of this year and the leading independent maker is devoting rail mill capacity chiefly to sheet bars at present. Steady demand is noted for light rails, both from industrial plants and in connection with coal mine operations.

The Carnegie Steel Co. is still quoting the March 21, 1919, prices, these being 2.45c. for 25 to 45-lb. sections, \$2.49 1/2c. for 16-lb. and 20-lb. sections, 2.54c. for 12-lb. and 14-lb. sections, and 2.58 1/2c. for 8-lb. and 10-lb. sections. This company is also quoting standard sections 50 lb. and heavier at \$45 for Bessemer and \$47 for open hearth stock. The Cambria Steel Co. is quoting 25-lb. to 45-lb. sections at 3.75c., 16-lb. and 20-lb. sections, 3.79 1/2c., 12-lb., 3.84c., at mill, for such delivery as it can make. The Jones & Laughlin Steel Co. is quoting light rails at 3.25c. for 25 to 45-lb. sections.

Old Material.—The market here has grown distinctly weaker in the steel works grade since last reports. This condition is the result of the withdrawal of the steel companies from the market, following their recent big purchases, and the fact that the recent advance to \$30 per ton, or more, for heavy melting steel brought out something of a flood of offerings by holders anxious to "cash in." These offerings coming at a time when only the dealers were buying has forced a recession of about \$1 a ton in the steel works grade. There seems to be a fairly general belief that the reaction will

be short lived, as there has been no material decline in the price of pig iron, while the fact that the movement of ore to furnaces in the Pittsburgh district has been below normal is expected to mean a compensating increase in the use of scrap in the making of both iron and steel. The market also is weaker on steel foundry grades, but has not eased off any to speak of in material used by gray iron foundries.

We quote for delivery to consumers' mills in the Pittsburgh and other districts that take Pittsburgh freight rates as follows:

Heavy melting steel, Steubenville, Follansbee, Brackenridge, Monessen, Midland and Pittsburgh, deliv.	\$28.50 to \$29.00
No. 1 cast (for cupola).....	42.00 to 43.00
Rerolling rails, Newark and Cambridge, Ohio; Cumberland, Md.; Franklin, Pa., and Pittsburgh.....	39.00 to 40.00
Compressed sheet steel.....	24.00 to 24.50
Bundled sheet sides and ends, f.o.b. consumers' mills, Pittsburgh, dist.	17.00 to 18.00
Railroad knuckles and couplers.....	30.50 to 31.00
Railroad coil and leaf springs.....	30.50 to 31.00
Railroad grate bars.....	30.50 to 31.00
Low phosphorus melting stock (bloom and billet ends, heavy plates) 1/4 in. and heavier.....	34.00 to 35.00
Railroad malleable.....	35.00 to 36.00
Iron car axles.....	55.00 to 56.00
Locomotive axles, steel.....	46.00 to 47.00
Cast iron wheels.....	43.00 to 44.00
Steel car axles.....	42.00 to 43.00
Rolled steel wheels.....	31.00 to 31.50
Machine shop turnings.....	16.50 to 17.00
Sheet bar crop ends (at origin).....	31.50 to 32.00
Heavy steel axle turnings.....	24.00 to 25.00
Short shoveling turnings.....	19.50 to 20.00
Heavy breakable cast.....	37.00 to 38.00
Stove plate.....	31.50 to 32.00
Cast iron borings.....	20.50 to 21.00
No. 1 railroad wrought.....	33.00 to 34.00

REFRACTORY MARKET

Improved Railroad Situation Has Very Favorable Influence

PITTSBURGH, Sept 13.—The past few weeks have been marked by considerable improvement in the railroad transportation situation, and in no other industry has this exerted a better influence than in refractories. Manufacturers, who recently were obliged to stock practically all of their products for lack of sufficient supplies of cars, now are making shipments at least equal to production and in some instances have been able to make slight reductions in accumulated stocks. Prices in all classes of brick are firmly maintained, not only because the bookings of the manufacturers are sufficient to engage capacity for practically the remainder of the year, but because there is nothing in sight suggestive of any lowering of producing costs. On the contrary, the recent adjustment of coal miners' wages will mean some additional cost to the manufacturers, many of whom operate their own mines, and are obliged to meet wage increases in order to maintain their mine organizations. There has been practically no recession in the cost of coal to those manufacturers who have to buy their coal, and it is a well-established fact that refractory plant labor is none too plentiful.

The matter of a new set of extras for brick of other than standard shapes and dimensions still is getting the serious consideration of the trade. It is more than probable that the new card to be adopted will be patterned after the one employed by the makers of steel plates. This card of extras is on a percentage basis, and it seems to be the idea of the makers of refractory brick that both the base price and extras should advance or decline together. It was asserted that only a small percentage of the production of blast furnace and open-hearth furnace brick comes within the extras classification, for the appearance of orders for any substantial quantity of any particular shape usually means that this shape is placed in the classification of standard brick. The effort of the industry to reduce the number of standard shapes has been rendered extremely difficult by the tendency of furnace engineers, to design new shapes, which, it is stated, in many cases are drawn up more from an artistic than a practical standpoint. It also is said that heavy losses frequently are sustained in making these special

shapes for the loss in manufacture sometimes runs as high as 30 to 40 per cent.

We quote per 1000 f.o.b. works:

	High Duty	Moderate Duty
Pennsylvania	\$50.00 to \$60.00	\$45.00 to \$50.00
Ohio	47.00 to 55.00	40.00 to 45.00
Illinois	50.00 to 55.00	40.00 to 45.00
Kentucky	50.00 to 55.00	45.00 to 50.00
Missouri	60.00 to 65.00	50.00 to 55.00
<i>Silica Brick:</i>		
Pennsylvania		\$55.00 to \$60.00
Chicago		65.00
Birmingham		55.00 to 60.00
<i>Magnesite Brick:</i>		
Standard size, per net ton		110.00
<i>Chrome Brick:</i>		
Standard size, per net ton		100.00
<i>Bauxite Brick:</i>		
55 per cent per net ton		50.00
76 per cent per net ton, base		50.00

San Francisco

SAN FRANCISCO, Sept. 7.

The local iron and steel market is very dull, the light demand being due to large orders being filled prior to the freight rate increases. Numerous inquiries are being made, however, in the structural steel market. Heavy shipments of scrap have arrived by water from Panama, Mexico and Central America.

Bars.—Reinforcing bars are quoted at \$4.75 on carload lots from local mills, \$5.50 from local stocks and \$5.75 on less than carload lots from warehouse stocks. Merchant bars are \$5.45 up to 3 in. for rounds, and up to 2 1/2 in. on squares. Larger sizes are \$6.70. Steel bands have advanced to \$7.15 under 3/4 in. and \$6.15 over. The increase amounts to about \$20 per ton. Jobbers' prices on stocks rolled here have gone up 15c. per 100 lb. and 70c. on stocks from Eastern mills. Cold-rolled steel shafting has advanced 75c. per 100 lb.

Pig Iron.—The demand is exceedingly light. No raises have been made to date except in some instances where the new rail freight rate is reflected on new orders. Deliveries are remote.

Coke.—Prices are the same, with plenty of stock on hand and a poor market. Quotations are from \$30 to \$35.

Structural Steel.—Indications point to an active market in the next few weeks, but no large contracts have been let during the past two weeks. Quotations are \$4.45 per 100 lb.

Wrought Pipe.—Jobbers' prices have advanced, based on the freight increase, from \$1.25 to \$1.66 1/2 per 100 lb. in carload lots. Wrought pipe, casting and tubing is hard to obtain, due to the continued car shortage.

Chicago

CHICAGO, Sept. 14.

Although most consumers are pressing for deliveries against existing commitments, there has been a marked falling off in new business in most commodities. Wire products constitute an exception, as do rails and track accessories. According to present indications, Western mills will book from 800,000 to 1,000,000 tons of rails for 1921 rolling. Much of this business is pending until the Steel Corporation sets its prices and until the Colorado mill takes final action on several inquiries now before it. That individual railroad purchases will be generous is evidenced by the fact that the Santa Fe is negotiating for 120,000 tons. The Illinois Central has made reservation for 60,000 tons for the same delivery. Car inquiries continue to develop, although few orders are actually being placed. In a number of cases financial difficulties are known to have interfered with the placing of orders, but this situation will be altered if easier money conditions obtain later in the fall. Inquiries from farm implement manufacturers are largely for material to fill in gaps in stocks now on hand or on order. One Western mill has received inquiries of this sort during the past week aggregating 10,000 tons.

Blast furnaces in the district are being pressed hard for deliveries by their customers, and at the same time several melters are offering resale iron in round tonnages. The pig iron market is dull but firm. Scrap, on the other hand, is soft.

Local furnace and mill operations are on about the same scale as previously reported. In Indiana the recent coal difficulties resulted in the passage of a bill by a special session of the Legislature authorizing the creation of a fuel and food commission with regulatory powers over prices and distribution. Last week the validity of the act was upheld by a Federal court, the occasion being an application for an injunction to restrain the fuel commission from exercising its functions.

Pig Iron.—So far as new business is concerned, the market continues dull, but in other respects the situation is one of contradictions. On the one hand, foundries are pressing local furnaces hard for deliveries against existing commitments, and at the same time some melters in the district are offering resale iron. Among the lots offered are 5000 tons of charcoal, foundry and silvery, 3000 tons of foundry, 800 tons of foundry and 300 tons of the same class of iron. Thus far the resale offerings have not had an adverse effect on prices, the quotations of the past few weeks still holding firmly. Makers of copper-free low phosphorus, in fact, have advanced their prices to \$60, furnace. Among current sales was a lot of 500 tons of copper free material for delivery over the remainder of the year at approximately the quotation just named. An inquiry for a like tonnage from Canada is before the trade. Other inquiries include 500 tons of charcoal for first half shipment, 300 tons of foundry for delivery during the remainder of this year, and 200 tons of malleable for prompt shipment. Reports from Michigan indicate that some of the foundries which had been serving the automobile industry exclusively are now getting railroad work. Although railroad buying has not yet developed to any volume, it is gradually gaining headway and is looked to as a source of considerable tonnage for foundries in this territory.

The following quotations are for iron delivered at consumer yards except those for Northern foundry, malleable and furnace, and do not include a switching charge averaging 7¢ per ton.

Lake Superior charcoal, averaging sil.	
1-1/2 tonne grades subject to usual differences), deliv. at Chicago	\$58.50
Northern coke, No. 1, sil. 2.25 to 2.75 last half	48.25
Northern coke, No. 1 spot	48.25
Northern coke, foundry, No. 2, sil. 1.75 to 2.25 last half	46.00
Northern coke, No. 2 spot	46.00
Southern high phos., last half	45.00
Southern coke, No. 1 foundry and No. 1 soft, sil. 2.75 to 3.25	\$50.92 to 51.87
Southern coke, No. 2 foundry, sil. 2.25 to 2.75	49.92 to 50.37
Southern foundry, sil. 1.75 to 2.25	48.67
Malleable not over 2.25 sil.	46.50
Basic	46.00
Low phos. (copper free)	60.00
Silvery, 7 per cent	63.32

Ferroalloys.—The market is quiet in all of the ferroalloys. The delivered price of ferromanganese heretofore quoted below has been based on the freight from the Gulf ports. As the commoner avenue of shipment of English material is via the Atlantic ports, domestic sellers are generally following the plan of adding the hypothetical freight from Eastern seaboard. From Philadelphia this would be \$9.94.

We quote 75 to 80 per cent ferromanganese, delivered, \$179.94; 50 per cent ferrosilicon at \$85, delivered; spiegeleisen, 18 to 22 per cent, \$85 furnace.

Plates.—Whereas the foremost interest has heavy bookings ahead, independents are in need of new business, and it is apparent that some of them would accept attractive tonnages of sheared plates of tank quality at 3.25c. Pittsburgh. The ruling independent quotation, however, continues to be 3.50c. Pittsburgh, with few new orders developing. The Steel Corporation subsidiaries continue to take new orders for indefinite delivery, but have not yet opened their books for fourth quarter contracts. The leading local independent is in a position to make September and October delivery on new business. On the whole, the market continues dull, notwithstanding the appearance of two large inquiries from the West. Pacific Coast shipyards want 20,000 to 25,000 tons of steel, principally plates, for the construction of six tank vessels. The city of Seattle has revived an inquiry for 13,000 tons of plates for a pipe line. It is estimated that there are live inquiries in the market for 18,000 freight cars, but the railroads are slow in placing orders.

The mill quotation is 2.65c. to 3.50c. Pittsburgh, the freight to Chicago being 38c. per 100 lb. Jobbers quote 3.78c. to 4.28c. for plates out of stock.

Structural Material.—Little business is developing and many independent mills are in a position to make early shipments against new commitments. The foremost local independent, for example, can make deliveries in 60 days or earlier, depending on rolling schedules. Independent prices are not well defined owing to the small volume of sales, but plain material continues to be quoted at from 3.10c. to 3.25c. Pittsburgh. There are few new inquiries and orders for fabricated material to report. Lettings include:

Weil Brothers, manufacturing plant, Michigan City, Ind., 320 tons, to American Bridge Co.

North Dakota Industrial Commission, elevator hoppers, Grand Forks, 104 tons, to Minneapolis Steel & Machinery Co.

Inquiries include:

National Lamp Works, factory building, Indianapolis, 600 tons.

L. C. Gerding, garage, Denver, 350 tons.

The mill quotation is 2.45c. to 3.25c. Pittsburgh, which takes a freight rate of 38c. per 100 lb. for Chicago delivery. Jobbers quote 3.58c. to 4.08c. for materials out of warehouse.

Sheets.—The loss of automobile business has caused independent mills to trim their prices to obtain new bookings. Quotations on blue annealed for 30 to 60 days' delivery range from 5.50c. base to 6.50c.; on black from 7c. to 7.50c. base, and on galvanized from 8.25c. to 9c. Rumors of lower quotations on blue annealed are afloat, but when traced down are found to be offerings of light gages of plates by plate makers lacking business in their regular line. Quotations on this material run as low as 4.50c. to 5c. Mill quotations are 4.35c. to 7.50c. for No. 28 black.

Mill quotations are 4.35c. to 7.50c. for No. 28 black; 3.55c. to 6c. for No. 10 blue annealed, and 5.70c. to 9c. for No. 28 galvanized, these all being Pittsburgh prices, subject to a freight to Chicago of 38c. per 100 lb. The lowest prices are those of March 21, 1919.

Jobbers quote: Chicago delivery out of stock, No. 10 blue annealed, 7.13c.; No. 28 black, 8.10c.; No. 28 galvanized, 9.60c.

Wire Products.—Wire and wire nails are the scarest of iron and steel products and the one group of commodities of which it may still be said that the market lies in the hands of the sellers. Production in all of the Steel Corporation mills is fairly good and in the Western plants at over 80 per cent of capacity. Steadily improving rail service is making larger shipments possible. For mill prices, see finished iron and steel, f.o.b. Pittsburgh, Page 747.

Rails and Track Supplies.—According to present indications Western mills will book from 800,000

to 1,000,000 tons of rails for 1921 rolling. Many tentative reservations, of course, will not be translated into contracts until the Steel Corporation sets its prices for the coming year and until the Colorado mill takes final action on several inquiries now before it. That individual railroad purchases will be generous is evidenced by the fact that the Santa Fe is negotiating for the rolling of 120,000 tons. Demand for track accessories for prompt shipment has fallen off, but large inquiries for 1921 delivery are held up pending action on complementary rail tonnages.

Standard Bessemer rails, \$45 to \$55; open hearth rails, \$47 to \$57. Light rails, 2.45c. to 3.50c., f.o.b. makers' mills. Standard railroad spikes, 3.35c. to 4c., Pittsburgh. Track bolts with square nuts, 4.60c. to 5c., Pittsburgh. Steel tie plates, 3c. to 4c. and steel angle bars, 2.75c. Pittsburgh and Chicago; tie plates, iron, 3.75c. to 4c.; f.o.b. makers' mills.

Cast Iron Pipe.—Most manufacturers have joined in an advance of \$4 a ton, making 4-in. water pipe \$88.10 Chicago, and 6-in. and larger \$83.10. Business is exceedingly dull, but pipe makers do not view with alarm the curtailment of general industrial activity in relation to the market for their product. It is to be noted that a large portion of the pipe business comes from municipalities, which for the major part of the year have been unsuccessful in floating bonds in competition with industries offering higher interest. A falling off in industrial financing will give the municipalities their opportunity.

We quote per net ton f.o.b. Chicago, ex-war tax as follows: Water pipe, 4-in., \$88.10; 6-in. and above, \$83.10; class A and gas pipe, \$4 extra.

Railroad Rolling Stock.—The anonymous inquiry for 5000 freight cars mentioned a week ago was put out by the Consolidated Railway Equipment Corporation, 710 Union Trust Building, Washington. This company has been organized by American short line railroads with \$1,000,000 capital stock and with the help of the Government proposes to purchase cars and locomotives to the extent of \$20,000,000. Action on the inquiry for cars, which includes 1000 general service, 1000 double sheathed box, 1000 single sheathed box, 1000 flat and 1000 hopper cars, will be held up until the financing is arranged for. The Central of Georgia is in the market for 500 box, 200 flat bottom coal cars and 100 stock cars. The American Railway Equipment Co., Philadelphia, is inquiring for 100 hopper cars of 50 to 70 tons capacity. The West Virginia Pulp & Paper Co., New York, wants 25 steel hopper cars of 50 tons capacity. The Chicago & Northwestern has ordered 250 refrigerator cars, 50 caboose cars and 25 passenger cars from the American Car & Foundry Co. The Bertha Coal Co., Pittsburgh, has bought 100 steel hopper cars of 70 tons capacity from the Ralston Steel Car Co. The Pere Marquette has ordered 12 coaches and 12 baggage cars from the Standard Steel Car Co. The Delaware, Lackawanna & Western has bought 25 steel frame caboose cars, and the Midland Refining Co., Eldorado, Kan., 50 tank cars of 8000 gallons capacity. The Union Pacific is asking for figures on passenger equipment.

Bars.—Inquiry for mild steel bars is not so plentiful as a few weeks ago, and at the same time some Eastern mills are able to offer tonnage released by the automobile industry. One important producer, for example, will book light sizes for 60 days' delivery at 4c., Pittsburgh, and heavier sizes at 3.50c. One Western mill continues to take care of its customers at 3c., Pittsburgh, but in general independent quotations are higher. The foremost interest is taking no new commitments except where bars are complementary to other materials, as in the case of railroad car business, and has not opened its books for 1921. The leading local independent is also out of the market. Activity by farm implement manufacturers is confined largely to securing tonnages to complete what they now have in stock or on order. One Western mill has received several inquiries of this sort aggregating 10,000 tons. It is expected that implement concerns will contract for their first quarter and first half requirements some time in October. Inquiry for bar iron has fallen off, railroad purchases being notably small. Rail carbon steel bars are also rather dull, although one mill reports a good run of orders during the past week.

Mill prices are: Mild steel bars, 2.46c. to 4c.; Pittsburgh taking a freight of 38c. per 100 lb.; common bar iron, 3.75c. to 4c., Chicago; rail carbon, 4c. mill.

Jobbers quote 3.48c. to 3.98c. for steel bars out of warehouse. The warehouse quotation on cold rolled steel bars is 5.90c. for rounds and 6.40c. for flats and squares, an extra of 15c. per 100 lb. applying to orders exceeding 1000 lb. and unded 2000 lb. and an extra 35c. for orders up to 1000 lb. Jobbers quote hard and medium deformed steel bars at 4.65c.

Bolts and Nuts.—While farm implement manufacturers and railroads are pressing makers hard for deliveries against contracts, new business has fallen off. It is also to be noted that production is commencing to catch up on bookings. August was the first month this year that a large Western manufacturer turned out bolts and nuts in excess of new commitments and reports up to date forecast that the same will hold true in September. Thus far most manufacturers in this district have refrained from advancing their prices to conform with those of Eastern makers. Local jobbers have advanced their prices to conform with Eastern makers. Local jobbers have advanced hot pressed nuts, square tapped and hexagon tapped, as well as blank nuts, to list price plus \$1.15. For mill prices, see Finished Iron and Steel, f.o.b. Pittsburgh, Page 747.

Jobbers quote structural rivets, 5.73c., boiler rivets, 5.83c.; machine bolts up to $\frac{1}{2}$ x 4 in., 20 per cent off; larger sizes, 10 off; carriage bolts up to $\frac{1}{2}$ x 6 in., 10 off; larger sizes, 5 off; hot pressed nuts, square tapped and hexagon tapped, list price plus \$1.15; blank nuts, list price plus \$1.15; coach or lag screws, gimlet points, square heads, 30 per cent off. Quantity extras are unchanged.

Old Material.—Consumers are notably absent from the market and a general weakening of prices has taken place. Among the few purchases by users was 1000 tons of No. 1 wrought at \$24 per net ton. Several smaller purchases, however, have been made at a slightly higher figure. Railroad offerings are liberal. The Pennsylvania Northwest system and the Southern Railway have advertised 2500 tons each, the Chicago & Eastern Illinois 2000 tons, the Northern Pacific and the Pullman Co. 1500 tons each, and the Omaha 300 tons.

We quote delivery in consumers' yards, Chicago and vicinity, all-freight and transfer charges paid, as follows:

	Per Gross Ton
Iron rails	\$35.50 to \$36.00
Relaying rails	57.50 to 62.50
Car wheels	37.00 to 38.00
Steel rails, rerolling	37.50 to 38.50
Steel rails, less than 3 ft.	27.50 to 28.00
Heavy melting steel	24.50 to 25.00
Frogs, switches and guards, cut apart	24.50 to 25.00
Shoveling steel	24.00 to 24.50
Low phos. heavy melting steel	28.50 to 29.00
Drop forge flashings	20.00 to 20.50
	Per Net Ton
Iron angles and splice bars	\$33.50 to 34.00
Steel angle bars	24.50 to 25.00
Iron arch bars and transoms	34.50 to 35.00
Iron car axles	43.50 to 44.00
Steel car axles	33.00 to 34.50
No. 1 busheling	19.50 to 20.00
No. 2 busheling	12.00 to 12.50
Cut forge	23.00 to 23.50
Pipes and flues	16.00 to 16.50
No. 1 railroad wrought	24.00 to 24.50
No. 2 railroad wrought	23.00 to 23.50
Steel knuckles and couplers	25.00 to 25.50
Coil springs	26.00 to 26.50
No. 1 cast	34.50 to 35.00
Boiler punchings	25.00 to 25.50
Locomotive tires, smooth	23.00 to 23.50
Machine shop turnings	9.50 to 10.00
Cast borings	13.00 to 13.50
Stove plate	27.50 to 28.00
Grate bars	27.50 to 28.00
Brake shoes	25.50 to 26.00
Railroad malleable	28.00 to 28.50
Agricultural malleable	27.00 to 27.50
Country mixed	17.00 to 18.00

Boston

BOSTON, Sept. 14.

Pig Iron.—The lifting of all embargoes resulted in a heavy movement of pig iron into New England during the past week. Some foundries have asked furnaces to hold up shipments. As a result, the demand is largely limited to car lots of spot, and even such business is scarce. A Portland, Me., melter bought a car of resale Northern, silicon 3.50 to 4.00, at \$51 furnace base, shipment from Ohio point with an \$8 freight, and five cars Buffalo district iron, silicon 3.50 to 3.75, at \$56.50 furnace and one car, silicon 4.00, at \$57.50 furnace. A New Hampshire foundry bought a car of Buffalo resale, silicon 3.25 to 3.75, prompt shipment, at \$53 furnace, a Greater Boston firm 100 tons Alabama, silicon 2.25 to 2.75, October-November shipment, at \$43.25 furnace.

and a Franklin, Mass., melter two cars, silicon 2.75 to 3.25, prompt shipments, at \$44.25 furnace. Several cars of Virginia spot iron sold at \$52 furnace base. A South Boston melter took 250 tons Alabama, silicon 1.75 to 2.25, at \$42 furnace, and a Massachusetts melter 300 tons eastern Pennsylvania, silicon 2.25 to 2.75, at \$51.25 furnace, deliveries in both instances being first quarter. A sale of 200 tons Ohio malleable, prompt shipment, at \$47.50 furnace, is reported. One Virginia furnace offers a large number of small tonnages of off iron for prompt shipments at prices ranging from \$45 to \$56.60 furnace. A barge of Sloss iron, 1191 tons, silicon 1.75 to 2.25, arrived at Providence, R. I., yesterday, some of which is available. The total sales of all iron for the week are approximately 2000 tons. Delivered prices follow:

East. Pa., sil. 2.25 to 2.75.....	\$55.31 to \$60.00
East. Pa., sil. 1.75 to 2.25.....	54.06 to 58.06
Buffalo, sil. 2.25 to 2.75.....	55.96 to 56.71
Buffalo, sil. 1.75 to 2.25.....	54.71 to 55.46
Virginia, sil. 2.75 to 3.25.....	59.27 to 61.27
Virginia, sil. 2.25 to 2.75.....	57.52 to 59.52
Virginia, sil. 1.75 to 2.25.....	56.27 to 58.27
Alabama, sil. 2.75 to 3.25.....	51.91 to 55.67
Alabama, sil. 2.25 to 2.75.....	50.91 to 53.92
Alabama, sil. 1.75 to 2.25.....	49.66 to 52.67

Coke.—The demand for spot foundry coke is a shade better, but the market is by no means active, for New England ovens have materially increased shipments of contract fuel during the past fortnight. The New England Coal & Coke Co. continues to quote on a delivered basis of \$23.70, where the freight rate does not exceed \$3.40. It is intimated the market may be lower within the near future. This company's price on crushed coke is \$17 f.o.b. ovens. The Providence Gas Co. continues to ship at original contract prices.

Finished Material.—New specifications for bars and bands are normal, with the former selling at 3.50c., f.o.b. Pittsburgh, and higher. Mill schedules mean more than they have, consequently shipments are freer. One mill that was accepting plate business at 3.25c. to 3.50c. f.o.b. Pittsburgh, is nearer a 3.75c. base now. A Groton, Conn., shipyard is in the market for 211 tons of plates. Canadian bidders were awarded 950 tons of shapes for an international highway bridge between Madawaska, Me., and Edmundston, N. B. No other structural tonnage of importance has been awarded since last reports. Local warehouses are getting plenty of large sizes of iron and steel, but small continue in light supply and urgent request. Jobbing prices on heavy hardware are very strong.

Jobbers quote: Soft steel bars, \$5.50 to \$6.50 per 100 lb. base; flats, \$6.50 to \$6.85; concrete bars, \$6 to \$6.50; tire steel, \$7 to \$7.50; spring steel, open hearth, \$11; crude, \$16; steel bands, \$8 to \$8.25; steel hoops, \$9; toe cable steel, \$8; cold-rolled steel, \$10 to \$10.50; structural, \$6 to \$8.50; plates, \$6.50; No. 10 blue annealed sheets, \$9; No. 22 black sheets, \$9.15; No. 28 galvanized, \$10.50; refined iron, \$5.50 to \$8; best refined, \$7 to \$7.50; Wayne, \$8.50; band iron, \$8; hoop iron, \$9; Norway iron, \$20.

Old Material.—No. 1 machinery cast has sold as high as \$48.50 delivered since last reports, and a considerable tonnage at \$48. The demand, however, is not as active at the moment, inasmuch as foundries are fairly well covered and they also are getting plenty of pig iron. Additional sales of No. 2 machinery cast are reported at \$42 delivered. This scrap was bought in New York, where the market is lower, and shipped into New England. A sale of two cars of mixed No. 1 and No. 2 at \$43.50 delivered also is reported. The American Steel & Wire Co., Worcester, Mass., has bought several thousand tons of railroad steel or its equivalent at \$23 shipping point where the freight is not more than \$3.50. Buying of heavy melting steel for Pittsburgh mill account at \$21.50 and \$22 shipping point, or about \$28 delivered continues. Local buying for export has ceased, the last lot being taken at \$22 on dock. Buying of cast iron borings at \$25 delivered for the Central Iron & Steel Co., Harrisburg, Pa., has stiffened the market for that material. A Portland, Me., rolling mill this week bought 1000 tons cotton ties, at \$17 to \$19 delivered, and small tonnages of axles at former prices. Machine shop turnings are a little more active at \$14 to \$15 shipping point, and in one instance, at

least \$15.25 was paid. Local yard prices on old material follow:

No. 1 heavy melting steel.....	\$18.00 to \$22.00
No. 1 railroad wrought.....	28.00 to 29.00
No. 1 yard wrought.....	22.00 to 23.00
Wrought pipe (1-in. in diameter, over 2 ft. long).....	18.50 to 19.00
Machine shop turnings.....	14.00 to 15.00
Cast iron borings.....	18.00 to 19.00
Heavy axle turnings.....	15.00 to 16.00
Blast furnace borings and turnings.....	13.00 to 14.00
Forged scrap.....	12.00 to 13.00
Bundled skeleton.....	12.00 to 13.00
Street car axles.....	31.00 to 32.00
Car wheels.....	37.00 to 38.00
Machinery cast.....	43.50 to 44.50
No. 2 cast.....	37.00 to 38.00
Stove plate.....	27.00 to 28.00
Railroad malleable.....	28.00 to 29.00
Rerolling rails.....	32.00 to 33.00

Buffalo

BUFFALO, Sept. 13.

Pig Iron.—The market is quiet with few sales and not a great deal of interest displayed by consumers. This is partly the result of a lull in business and the higher prices, although some makers ascribe it to the customary uncertainty preceding a presidential election. Makers are optimistic and believe that any depression which has been felt in some branches of business will be more than counterbalanced by railroad purchases, though, so far there has been no indication that the railroads have yet begun their period of reconstruction of equipment. The new prices appear to be firm, and one maker here during the week accepted 1000 tons of the various grades of foundry at a base price of \$50 for delivery the last half. Another maker sold 600 tons of low silicon foundry at \$50 for delivery over the first half. There is a lessening of inclination to quote on first half delivery because most furnaces will have to carry over thousands of tons. Basic makers are not quoting, but state that they would accept no tonnage under \$50.

We quote f.o.b. Buffalo:	
No. 1 foundry, 2.75 to 3.25 sil.....	\$53.00
No. 2 X foundry, 2.25 to 2.75 sil.....	51.25
No. 2 plain, 1.75 to 2.25 sil.....	50.00
Basic.....	48.50
Malleable.....	51.25
Lake Superior charcoal.....	\$58.00 to 60.00

Finished Iron and Steel.—The situation is about the same as last week, with strong demand for certain grades and light inquiry in others. Mills are unable to satisfy the demand for bars, which is leading to an increased demand for warehouse material. The demand for structural material is showing some improvement over the past few months. There is no satisfying the demand for wire products and pipe. Wire mills are sold up seven and eight months ahead. Tin plate has eased off a little, probably due to the canning season coming to an end. Canning companies this year, contrary to general custom, are carrying no surpluses over. This indicates a heavy demand and brisk market next year. The demand for plates is not very heavy this week, following a month of fairly good business with these mills. Independents are maintaining the 3.50c. price, which is, they say, the lowest price they can make to take a profit. The demand for cold finished material is heavy, despite the period of quietness which has set in in the automobile trade. The demand is not coming from this trade now. Mills whose business is done with automobile makers look for a lull of probably 90 days, but feel that the present slowing of demand is a healthy readjustment and look for a big business year in 1921. Reinforcing bars are quiet, with some business being done with Cuba.

Warehouse prices f.o.b. Buffalo are: Steel bars, 4.65; shapes, 4.50; plates, 4.70; No. 10 blue annealed sheets, 7.15; No. 28 black sheets, 9.10; No. 28 galvanized sheets, 10.60; hoops, 6.60.

Old Material.—That feeling of softness which has been observed in the market for the past two weeks is still plainly apparent. The market is in a very unrestful condition and presents the paradoxical aspects of a heavy demand but an unmistakable feeling of uncertainty. There is a demand in some quarters for steel

for immediate delivery—material that is urgently needed by reason of the fact that time of delivery has almost expired. Dealers are making efforts to ship these tonnages. There are many instances of rejections, and while last week mills were willing to make adjustments in price and accept shipment, this week they are declining to accept them under any conditions, with the result that the railroads have threatened to place an embargo on at least one mill if some way of remedying the rejection evil is not immediately forthcoming. There is a strong demand for turnings and borings. The tonnage of this material wanted, in the aggregate, is almost unlimited. All inquiry, or almost all, covers practically immediate delivery, which is leading dealers to speculate on what sort of conditions they will be contending with within the next sixty days.

We quote dealers' asking prices per gross ton, f.o.b. Buffalo as follows:

Heavy melting steel, regular grades	\$26.00 to \$27.00
Hydraulic compressed	23.50 to 24.00
Low phos., .04 and under	33.00 to 34.00
No. 1 railroad wrought	31.50 to 32.50
No. 1 machinery cast	40.00 to 41.00
Iron and steel axles	42.00 to 43.00
Car wheels	40.00 to 41.00
Railroad malleable	32.00 to 32.50
Machine-shop turnings	15.00 to 16.00
Heavy axle turnings	19.50 to 20.50
Clean cast borings	21.00 to 22.00
Iron rails	31.00 to 32.00
Locomotive grate bars	25.00 to 26.00
Stove plate	31.50 to 32.50
Wrought pipe	20.50 to 21.50
No. 1 busheling	19.50 to 20.50
Bundled sheet stampings	16.50 to 17.50

Birmingham

BIRMINGHAM, ALA., Sept. 13.

Pig Iron.—Very little new business has been booked by Birmingham iron operators in September, but the lull was rather to have been expected after the big buying movement of July and August. One order for first quarter, 1921, delivery, consisting of 1000 tons, was closed during the week. New England and Cincinnati territories took a number of comparatively small lots for nearby delivery. The current inquiry has been for spot and nearby shipment more than for forward iron. Some hold-up requests have been received from consumers, who had over-ordered to clinch assurance of actual requirements and begin to find more metal coming into yards than they have present use for. These hold-up requests are of a spotty character and the tonnage involved is not large. The Southern buyers remain indifferent to the 1921 market and continue to be conspicuous by their absence from the inquiry list. They are well covered for the remainder of the year and bank on assurances that they will be protected. The active Alabama stacks have been working well. The August production shows a 20 per cent increase over the preceding year and the eight months' production of Alabama stacks an increase over 1919 of 25 per cent. None of the iron interests was affected by the first week of the so-called general strike declared by the miners' union, nor was there at its close any indication of menace to steel and iron mill operation. None of the really large mines heeded the strike call. The governor's strike commission found a deadlock between the union and operators as to recognition and is contenting itself with a general investigation of the whole coal industry without any prospect of becoming a real arbitration board. The general strike call brought out about 2000 to 3000 additional men not on strike prior to that time and the total of strikers at the close of the week was about 7000 to 8000 of the 27,000 miners of Alabama. The iron market is strong at \$42 with no interest worrying about the present lull.

We quote per gross ton f.o.b. Birmingham district furnaces, the Tennessee company excepted, as follows:

Foundry, sil. 1.75 to 2.25	\$42.00
Basic	41.00
Charcoal	\$58.00 to 60.00

Cast Iron Pipe.—The new water and gas pipe price schedule going into effect Sept. 11, as announced by the U. S. Cast Iron Pipe & Foundry Co., is as follows: Class B water pipe, \$74 for 6-in. and upwards, and \$79 for 4-in.; gas pipe, \$78 for 6-in. and upwards and \$83 for

4-in. sizes. The prior schedule was \$70 for 6-in. and upwards and \$73 for 4-in. for both water and gas pipe. This market seems in a healthy condition with shops busy. Sanitary shops report cancellations, but say these cancellations are due to pyramiding orders on the part of consumers, who took that action to be assured of delivery of requirements. The trade is certain of satisfactory operations for remainder of the year, although there is not much new business. The U. S. Cast Iron Pipe & Foundry Co. and the American Cast Iron Pipe Co. are jointly shipping 5000 tons to the Pacific Coast via Mobile and the Panama Canal, and the former is moving 1000 tons to Cuba and 500 tons to Santos, Brazil, via Brunswick.

Coal and Coke.—The mine strike failed during the first week to reduce the coal output more than 15 per cent. Large operators of mills have supplies on hand that will last for some time. Furnace coke brings \$10 and \$11 and foundry coke \$11.50 to \$15 for spot. New buyers pay still higher prices, one lot of foundry coke having been sold at \$18.

Old Material.—Big buyers of heavy melting steel have purchased quantities of material recently and are apparently in the market for more, although they continue to decline to pay higher than present quotations. Some dealers are holding just as hard for an advance. The scrap market is generally brisk and cars are moving the material better than usual.

We quote per gross ton f.o.b. Birmingham district yards, prices to consumers, as follows:

Old steel rails	\$24.00 to 25.00
Heavy melting steel	23.00 to 24.00
No. 1 cast	35.00 to 36.00
Car wheels	34.00 to 35.00
Tramcar wheels	32.00 to 34.00
No. 1 wrought	28.00 to 29.00
Stove plate	26.00 to 27.00
Cast iron borings	13.00 to 14.00
Machine shop turnings	13.00 to 14.00

St. Louis

ST. LOUIS, Sept. 13.

Pig Iron.—Foundrymen and other consumers of pig iron have not been in evidence to any great extent in the market the past week, having for the most part loaded themselves up with pig iron by anticipatory orders prior to the new railroad rates going into effect. The general impression at present is that most foundries, practically all of which are very active, will not need more material prior to the first of the year. As a result, furnace representatives have little to do at present. The prevailing price on No. 2 Southern just now is \$42, Birmingham. No. 2 Northern is held all the way from \$47. to \$50.25 per ton, Ironton, but no business is being transacted. Most of the furnaces represented in this market are out of the field at present, but whether from a sold-up condition or because of uncertainty as to cost of production is not positively known. One company is reported willing to take on a small tonnage at \$42, Birmingham.

Coke.—Coke seems a little easier, though no transactions are reported, the figure being set at \$18.50 to \$19 oven, with some hints of reduction shortly. There is some small buying for immediate needs, but no contracting.

Finished Iron and Steel.—Finished material deliveries are improving in some directions, but not general, as receipts continue to be rather spotted as to classes of material and time delivery. Stock out of warehouse is still moving up to the aggregate of receipts.

We quote for stock out of warehouse as follows: Soft steel bars, 4.07 1/4 c.; iron bars, 4.50 c.; structural material, 4.17 1/2 c.; tank plates, 4.37 1/2 c.; No. 10 blue annealed sheets, 7.27 1/2 c.; No. 28 black sheets, cold rolled, one pass, 8.29 c.; No. 28 galvanized, black sheet gage, 9.76 c.

Old Material.—The scrap market toward the end of the week developed a decided weakness and although there were no large transactions, the evident desire of some dealers, especially the smaller ones, resulted in the mills and other consumers in this district taking in some scrap at much reduced prices, while the larger dealers, when bargains were offered, also took in the material to fill existing contracts and in some cases to

lay down in the yards. The transactions, however, were none of them such as to establish quotations which could be regarded as a real market. Lists out included 1700 tons from the Wabash, 1000 tons from the Missouri, Kansas & Texas, 300 tons from the St. Louis and San Francisco, 800 tons from the Mobile and Ohio and 300 tons from the Kansas City Southern.

We quote dealers' prices, f.o.b. consumers' works, St. Louis industrial district, as follows:

Per Gross Ton

Old iron rails.....	\$32.50 to \$33.00
Old steel rails, rerolling.....	35.00 to 35.50
Old steel rails, less than 3 ft.....	25.00 to 25.50
Belaying rails, standard sections subject to inspection.....	50.00 to 55.00
Old car wheels.....	36.00 to 36.50
No. 1 railroad heavy melting steel.....	24.00 to 24.50
Heavy shoveling steel.....	22.00 to 22.50
Ordinary shoveling steel.....	21.50 to 22.00
Frogs, switches and guards, cut apart.....	26.00 to 26.50
ordinary bundled sheets.....	12.00 to 12.50

Per Net Ton

Heavy axles and tire turnings.....	\$15.00 to \$15.50
Iron angle bars.....	31.00 to 31.50
Steel angle bars.....	23.00 to 23.50
Iron car axles.....	40.50 to 41.00
Steel car axles.....	34.00 to 34.50
Wrought arch bars and transoms.....	33.00 to 33.50
No. 1 railroad wrought.....	25.00 to 25.50
No. 2 railroad wrought.....	23.00 to 23.50
Railroad springs.....	24.00 to 24.50
Steel couplers and knuckles.....	24.00 to 24.50
Locomotive tires, 42 in. and over, smooth inside.....	21.00 to 21.50
Cast-iron borings.....	14.50 to 15.00
No. 1 busheling.....	20.00 to 20.50
No. 1 boiler, cut to sheets and rings.....	17.00 to 17.50
No. 1 railroad cast.....	35.00 to 35.50
Stove plate and light cast.....	26.50 to 27.00
Railroad malleable.....	27.00 to 27.50
Agricultural malleable.....	25.50 to 26.00
Pipes and flues.....	17.50 to 18.00
Heavy railroad sheet and tank.....	15.00 to 15.50
Railroad grate bars.....	26.50 to 27.00
Machine-shop turnings.....	10.50 to 11.00
Country mixed.....	20.50 to 21.00
Uncut railroad mixed.....	21.50 to 22.00
Horseshoes.....	25.50 to 26.00
Brake shoes.....	24.00 to 24.50

New York

NEW YORK, Sept. 14.

Pig Iron.—Most reports indicate that nearly all foundries with the exception of those making castings for automobiles and silk-making machinery are busy and are receiving pig iron shipments. Transportation shows decided improvement and embargoes are seldom heard of. Scarcity of basic continues and one prominent eastern Pennsylvania maker is refusing to take on any additional tonnage. Reports of cutting on the quotation of \$51.25 Buffalo on malleable have been current, but confirmation is lacking. Some Alabama iron has been sold at a lower price delivered than the lowest quotation of eastern Pennsylvania furnaces. On the whole, the market may be said to be extremely quiet with melters awaiting developments.

We quote for delivery in the New York district as follows, the higher quotations being for prompt delivery and the lower for last half of 1920, except on Virginia iron, on which the two quotations are due to freight rates, one being at 40 per cent advance and the other at 33½ per cent:

East Pa., No. 1 fdly., sil. 2.75 to 3.25.	\$55.52 to \$57.52
East Pa., No. 2 X fdly., sil. 2.25 to 2.75.	53.77 to 55.77
East Pa., No. 2 fdly., sil. 1.75 to 2.25.	52.52 to 54.52
Buffalo, sil. 1.75 to 2.25.....	54.46
No. 2 Virginia, sil. 1.75 to 2.25.....	55.87 to 56.16

Cast-Iron Pipe.—The need for labor grows more acute. Manufacturers had hoped that when the textile mills laid off help they would be attracted to the pipe foundries, but most of them are unwilling to do the more dirty work. Though cancellations of orders have been reported in other districts, the New York district is free from them, which is remarkable because of the delayed deliveries and the near approach of the season when frost is in the ground. We quote, f.o.b. New York: Six-inch and larger, \$77.22; 4-in., \$87.22; 3-in., \$87.22, with \$2 additional for Class A and gas pipe.

Ferroalloys.—Consumers of ferromanganese continue to maintain a waiting attitude, which is not at all unexpected in view of the reduction in price by British producers about three weeks ago. There is no inquiry nor any sales reported and the market is quoted at \$170, seaboard, for the British alloy for delivery into June next year, with American producers

meeting this price. A Middle Western consumer who was inquiring for 600 tons for this year's delivery recently has withdrawn from the market. The spiegeleisen market is strong but quiet at \$82.50 to \$85, furnace, for the higher grade and \$80 for the lower. There have been sales of a few small lots. There are no new developments in the manganese ore market. Ferrosilicon, 50 per cent, is unchanged at \$80 to \$85 per ton delivered.

Finished Iron and Steel.—Due to the falling off in demand, prices of some steel products continue to show a softening tendency. While this is most pronounced in plates and shapes, there are indications of a somewhat easier position in steel bars. Buyers are apparently not so ready now to pay 4c., Pittsburgh, a price which was readily obtainable only a short time ago by those independent mills able to make promise of delivery this year. While 4c. has been paid within the last week on export bars, the domestic market may be nearer 3.75c., Pittsburgh, on such deliveries as bar mills are able to make in the near future. Bars for immediate shipment might fetch as high as 4c. Wire nails are stagnant, and while there is no change in the price situation there is not the pressure for supplies that prevailed only a month or two ago. A recent sale of 300 tons of nails by an independent producer was on the basis of 5.50c. per lb., Pittsburgh. In plates the effect of recent lack of buying is most pronounced. One result is that more mills are now willing to entertain business on the basis of 3.25c., Pittsburgh, this including mills which have been rigidly adhering to 3.50c. as their minimum. We note the sale of 5000 tons of ship plates for export at 3.35c., Pittsburgh. Several export lots have been taken by a Mississippi Valley mill at 3.25c., Pittsburgh, shipment being made via the Mississippi River and New Orleans. Structural shapes are obtainable at 3.10c. to 3.25c., Pittsburgh, the former price being quoted more frequently than a few weeks ago. Among new fabricated steel projects may be mentioned the Biltmore Hotel, Providence, R. I., involving 3000 tons. For the Boston & Maine 200 tons of bridge work is before the market. The American Bridge Co. will supply 1100 tons for the transit commission, New York, for the Lenox Avenue and Jerome Avenue shops, and a new job for the same commission for the Lawrence Street station, Brooklyn, 500 tons, is before fabricators. The American Bridge Co. has been awarded 200 tons for the Pennsylvania Railroad, which is still to close on 900 tons. The Phoenix Bridge Co. will supply 900 tons for the Virginian Railway; Eidlitz & Ross have been awarded 1200 tons for the New York Telephone Co. on West Seventy-third Street; the Hinkle Iron Co. will erect the Music Box theater on West Forty-fifth Street, 250 tons, and 800 tons have been put under contract for the Victor Talking Machine Co.'s power house, Camden, N. J. Inquiries for rails received by Eastern mills in the past week aggregate about 90,000 tons. The Steel Corporation meanwhile has entered round lots with the price to be named later. Actual general buying by railroads has not yet materialized in volume, due largely to their inability to finance themselves. For example, about 10,000 to 15,000 freight cars are held up pending the conclusion of financial arrangements. The Pressed Steel Car Co. has taken an order for 1000 steel hopper car bodies from the Chesapeake & Ohio. In a quiet market for semi-finished steel an inquiry for 3900 tons of special specification forging billets from a locomotive company stands out conspicuously.

We quote for mill shipments, New York, as follows: Soft steel bars, 2.73c. to 4.38c.; shapes, 2.83c. to 3.63c.; plates, 3.03c. to 3.88c., the minimum prices being for indefinite delivery and the highest prices for delivery in a few weeks; bar iron, flats, wider than 6 in., 5.38c., with half extras; light rounds, squares and flats, 5.88c. with full extras, and other sizes, 4.88c., with half extras.

Warehouse Business.—Prices remain unchanged since the recent revision. Moderate local buying is reported and there is a fair increase in stocks caused by improved mill shipments. One warehouse recently received several carloads of material not promised for delivery before next month and has been notified of further shipments. Buyers noting this improvement

are inclined to delay for possible lower prices and opportunity to buy from mill shipment. Pipe quotations may undergo a slight increase if mills revise their prices to meet the freight advance. The brass and copper mills are now operating at about 65 per cent of capacity and prices are nominal. We quote prices on page 764.

High Speed Steel.—Despite the prevailing dullness of the market, domestic producers still quote \$1.25 per lb., New York, for 18 per cent tungsten high speed steel. While there is a tendency in some quarters to undersell this quotation, a number of sales are being made at this price. Orders now being placed are small and some cancellations are reported.

Old Material.—The Jewish holidays early this week have slowed down business. The price of heavy melting steel has declined. Demand for Pittsburgh is not as heavy as a few weeks ago. One eastern Pennsylvania consumer of steel which usually pays the minimum or below market price has just come into the market for steel, paying \$19, New York. Cast borings have advanced \$1, \$21.50 being obtainable delivered to Perth Amboy, or \$25 to eastern Pennsylvania. Considerable cast scrap is being shipped to New England and there is reported a good demand and only fair supply.

Buying prices per gross ton, New York, follow:

Heavy melting steel.....	\$20.00 to \$21.00
Rerolling rails.....	36.50 to 37.00
Relaying rails, nominal.....	54.00 to 55.00
Steel car axles.....	39.00 to 40.00
Iron car axles.....	44.00 to 45.00
No. 1 railroad wrought.....	30.00 to 31.00
Wrought iron track.....	23.50 to 24.00
Forge fire.....	13.00 to 14.00
No. 1 yard wrought long.....	26.00 to 27.00
Light iron.....	9.00 to 10.00
Cast borings (clean).....	19.00 to 20.00
Machine-shop turnings.....	15.50 to 16.00
Mixed borings and turnings.....	14.00 to 14.50
Iron and steel pipe (1 in. diam., not under 2 ft. long).....	19.50 to 20.00
Stove plate.....	26.00 to 27.00
Locomotive grate bars.....	28.00 to 28.50
Malleable cast (railroad).....	28.00 to 29.00
Old car wheels.....	39.00 to 40.00

Prices which dealers in New York and Brooklyn are quoting to local foundries, per gross ton:

No. 1 machinery cast.....	\$42.50 to \$43.50
No. 1 heavy cast (columns, building materials, etc.), cupola size.....	42.50 to 43.50
No. 1 heavy cast, not cupola size.....	30.00 to 31.00
No. 2 cast (radiators, cast boilers, etc.).....	29.00 to 30.00

Cincinnati

CINCINNATI, Sept. 14.

Pig Iron.—Dullness has characterized the market. Few inquiries are being received and they are mostly for small tonnages for early shipment, with one exception, 5000 tons of Bessemer from an Eastern concern. Few sales were made in this territory during the week, the largest reported being 500 tons of malleable for first quarter delivery at \$46.50, southern Ohio furnace. We also note a sale of 300 tons of foundry at \$42, Birmingham. Lots aggregating 700 tons, silicon 1.25 to 1.75, for immediate shipment were disposed of by a southern Ohio furnace at a price reported to be \$47 furnace. Some resale iron is being offered at prices slightly below the market by concerns having a slack period, but the tonnages involved to date are small. One Virginia furnace company is offering iron running over 2.75 silicon for this year's delivery. Some of this is off iron, being high in sulphur content, but there are some standard lots on the list sent out, and figuring back the customary differentials, would bring it to \$45 furnace base. In the South \$42 represents the market and some furnaces which had been holding out for higher prices sold at this figure. Others are asking \$44, but few sales are reported at this figure. Some sales of Bessemer iron are reported to other territories, the largest being for 2000 tons at \$50, Eastern furnace.

Based on freight rates of \$4.50 from Birmingham and \$2.52 from Ironton, we quote f.o.b. Cincinnati:

Southern coke, sil. 1.75 to 2.25 (base price)	\$46.50
Southern coke, sil. 2.25 to 2.75 (No. 2 soft)	47.75
Ohio silvery, 8 per cent sil.	62.52
Southern Ohio coke, sil. 1.75 to 2.25 (No. 2)	\$48.52 to 49.52
Basic Northern	48.52
Malleable	48.52 to 49.52

Coke.—The coke market remains unchanged as to price, but car shortage is again reported to be affecting it in some districts. Consumers are desirous of contracting for their coke supply for first half of next year, but have been unable to get a price from the operators. Connellsburg furnace coke is quoted at \$17, foundry \$18, Wise County furnace \$16.50 to \$17, and foundry \$18.

Finished Material.—Local sales agencies report a brisk demand for standard rails from frog and switch companies, and also for the lighter sections from mining companies. Track fastenings are also being eagerly sought, particularly small spikes, while a virtual famine exists in the smaller sizes of bolts and nuts. While there has been a slowing up in the automobile demand for sheets, this has not affected mill operations to any extent, as most of them are sold up for the remainder of the year. Steel bars and wire products are very scarce, and prospects for improvement in the supply are not very encouraging. Plates and shapes are quiet. The Baltimore & Ohio Railroad has taken bids for a bridge over the Miami River at Lawrenceburg, Ind., and it is expected that the contract will be awarded shortly. This work involves about 4000 tons, and bidding is reported to have been very keen. The American Bridge Co. has taken a small tonnage for an addition to the power plant of the Union Gas & Electric Co. in this city. Rumors are current that the Big Four Railroad will build a bridge connecting Louisville, Ky., and Jeffersonville, Ind., but nothing official has been given out. A highway bridge connecting these two points, to be built by the states of Kentucky and Indiana, is also proposed, and the Indiana State Legislature has already arranged for its share of the expense. The matter will be brought up in the Kentucky Legislature at its next session. There is a possibility that both projects will be combined, and one bridge built to take care of both railroad and vehicular traffic. Local warehouses report business still good, with no signs of a letup. Prices have not been advanced as yet to take care of increased railroad rates, but it is reported that the increase will be made within the next 10 days.

Iron and steel bars, 5c. to 6c.; structural shapes, 4.50c.; plates, 4.50c.; cold rolled shafting, 6.25c.; steel bands, 6.50c.; No. 10 blue annealed sheets, 7.50c.; No. 28 black sheets, 9 to 10c.; No. 28 galvanized sheets, 10c. to 11c.; wire nails, 4.50 per kg base.

Tool Steel.—The market continues unchanged, although some fairly good inquiries were received during the week. These, however, have not developed into orders. Prices are firm, high speed steel still being quoted at \$1.25 per lb.

Old Material.—The fact that most consumers in the Pittsburgh and Cincinnati districts are now out of the market has had a tendency to soften scrap prices, particularly on the steel grades. Prices have been revised downward on some items by the dealers. Re-rolling rails and heavy melting steel are off \$1 from last week, and borings and turnings 50c. There is not much disposition to sell ahead on the part of dealers, most of whom have large stocks on their yards, and are disposing of it only when it can be loaded. The Norfolk & Western Railroad is offering considerable tonnage. The higher price on Southern iron has disappeared.

We quote dealers' buying prices:

	Per Gross Ton
Bundled sheets	\$14.00 to \$15.00
Old iron rails	27.00 to 28.00
Relaying rails, 50 lb. and up	50.00 to 51.00
Rerolling steel rails	31.00 to 32.00
Heavy melting steel	22.00 to 23.00
Steel rails for melting	24.00 to 25.00
Car wheels	36.00 to 37.00
	Per Net Ton
No. 1 railroad wrought	\$25.00 to \$26.00
Cast borings	11.00 to 11.50
Steel turnings	9.50 to 10.00
Railroad cast	32.00 to 33.00
No. 1 machinery	35.00 to 36.00
Burnt scrap	22.00 to 23.00
Iron axles	36.50 to 37.00
Locomotive tires (smooth inside)	24.50 to 25.50
Pipes and flues	16.00 to 16.50
Malleable cast	24.00 to 24.50
Railroad tank and sheet	16.00 to 16.50

Cleveland

CLEVELAND, Sept. 14.

Iron Ore.—Ore on docks Sept. 1 amounted to 8,554,450 gross tons, as compared with 6,705,062 tons on the same date a year ago. Receipts at Lake Erie ports last month were 7,095,430 tons and for the season 24,503,222 tons, as compared with 22,069,087 during the season to Sept. 1 last year. The better car supply recently is reflected in a gain in August of 681,000 tons in shipments from Lake Erie ports to interior furnaces as compared with July. Shipments from Lake Erie ports to interior furnaces during the month were 5,029,207 tons and for the season until Sept. 1 17,626,216 tons, as compared with 16,987,691 tons during the same period last year. August receipts at other than Lake Erie ports were 2,159,686 tons as compared with 878,567 tons during August, 1919. Lake front furnaces took 5,875,999 tons of ore up to Sept. 1, or approximately 1,000,000 tons more than during the same period last year.

We quote delivered lower Lake ports: Old range Bessemer, \$7.45; old range non-Bessemer, \$6.70; Mesaba Bessemer, \$7.20; Mesaba non-Bessemer, \$6.55.

Pig Iron.—The market is very dull in all grades and the buying of foundry iron for next year has almost completely stopped. One interest that has probably been the most active seller for that delivery in this territory sold during the week only 800 tons for next year. Its sales for this year in several small lots aggregated 2900 tons. These were made on the basis of \$46 and \$47, the former being the ruling price for next year. There is some feeling that unless a more active demand develops shortly there may be a little softening in prices for next year and some foundrymen, apparently sharing this feeling, are holding off on purchases. One Cleveland furnace recently opened up its books for the first half at \$46 for foundry iron and later advanced this price to \$47. However, a northern Ohio inquiry for 1000 to 1500 tons of foundry iron for the first half during the week brought a \$46 quotation from a southern Ohio furnace, and this price comes in competition with Cleveland made iron. The demand for spot foundry iron has about disappeared, but local prices remain unchanged at \$50. A Cleveland furnace which recently offered some high silicon foundry iron for early shipment received a number of inquiries, but the \$50 base price it quoted brought no orders. While the foundry melt has fallen off, furnaces are still able to ship all their iron and some will be carried over into next year. The iron that has been held up by the automobile industry in many cases is going to consumers to whom furnaces had been behind on shipments. The curtailment in the automobile industry has particularly affected the demand for high silicon low manganese malleable iron. The demand for Southern iron is inactive as consumers are not inclined to buy for next year. Southern iron is still being offered at \$42 for this year and for the first half.

We quote delivered Cleveland as follows, based on the new freight rates, these being a 56c. switching charge for coal iron, a \$1.26 freight rate from Valley points, a \$3.36 rate from Jackson and \$6.67 from Birmingham.

Basic	\$49.06
Northern No. 2 fdy., sil. 1.75 to 2.25	50.56
Southern fdy., sil. 2.25 to 2.75	49.92
Ohio silvery sil. 8 per cent	63.36
Standard low phosphorus Valley furnace	\$56.00 to 57.00

Finished Iron and Steel.—The demand for steel from the agricultural implement manufacturers continues heavy, and some are inquiring for steel bar contracts for the first half, but mills are declining to take orders for that delivery. Some steel bar business is being taken from this industry at 4c. for the fourth quarter. An easing up in the demand for steel bars is shown by the fact that a Pittsburgh district mill is offering large sizes for shipment in two or three weeks. Suspensions of shipments are still being ordered in considerable volume by some of the automobile companies. These include one lot of 2000 tons of forging steel for axles. Some automobile companies have asked that shipments be deferred until December. The demand from this source is not expected to show much of a revival this year, for should production of cars be increased, many manufacturers

have large stocks and plan to reduce their inventories sharply. Even with normal operations they will not find it necessary to carry as large stock as they have been because of improved deliveries by the mills. Plates are moving rather slowly and more mills are willing to take on tank plates at 3.25c. Contracts in connection with the blast furnaces of the Trumbull Cliffs Furnace Co., Warren, Ohio, have been placed. W. B. Pollock, Youngstown, Ohio, taking the stoves requiring 600 tons of steel and the Lackawanna Bridge Co. the skip incline, cast houses and boiler house requiring 400 tons. In building lines, considerable structural work that will require round lots of steel is developing in Cleveland, some of which is expected to be placed shortly, although definite inquiries have not yet come out. The latest large prospect is a 20-story office and theater building that will be erected by the Keith interests.

Cleveland warehouses quote steel bars at 3.34c. to 5c.; plates, 3.64c. to 4.50c., and structural material, 3.44c. to 4.50c.; No. 9 galvanized wire, 4.70c.; No. 9 annealed wire, 4c.; No. 28 black sheets, 8.50c.; No. 28 galvanized, 9.50c.

Sheets.—The sheet market is dull, but prices are holding rather firm except on blue annealed sheets in the heavier gages, which are freely quoted at 5.25c. For the lighter gages quotations range from 6c. to 6.25c. Independent mills quote black sheets at 6.50c. to 7c. and galvanized sheets at 7.25c. to 8.25c. for No. 28 gage. Some cancelled automobile body sheets are going on the market but are moving slowly. On these, mills are adhering to the 7.85c. price.

Rail and Track Supplies.—Several railroads in this territory have taken up with mills the matter of securing their rail requirements for 1921 but only one definite inquiry is reported, that being for 1000 tons from the Toledo Terminal Railways Co. Spikes are more active than for some time, sales aggregating 2000 tons being reported to various railroads in this territory.

Coke.—While deliveries by some producers are as slow as ever, the supply of foundry coke shows an improvement and prices are easier. Standard Connellsville foundry coke is being offered at \$17 to \$17.50, but sales are reported as high as \$19. We note the sale of several lots of Indianapolis by-product foundry coke at \$20.

Bolts, Nuts and Rivets.—Some business in bolts and nuts is being placed in fourth quarter contracts at the recent advance in prices. Specifications on contracts continue good from jobbers and implement manufacturers. A price advance of \$5 per ton has been made by some of the leading rivet manufacturers for fourth quarter contracts, making the price 4.75c., Pittsburgh, for structural, and 4.85c. for boiler rivets. The advance has been made to cover the additional cost of production due to the advance in freight rates and other increases in transportation charges that makers have had to pay to secure shipments of steel from the Pittsburgh mills during the car shortage. New demand is not active, but manufacturers still have a large backlog in orders.

Small machine bolts, rolled threads, 25 to 10 per cent off list; same sizes in cut threads, 25 per cent off list; larger and longer sizes, 25 per cent off list; carriage bolts, smaller and shorter, rolled threads, 20 and 10 per cent off; cut threads and larger and longer sizes, 20 per cent off list; lag bolts, 40 per cent off list; plow bolts, Nos. 1, 2 and 3 head, 25 per cent off list, the 20 per cent extra for other style heads being unchanged; machine bolts, both smaller and shorter, and larger and longer sizes, 10 per cent off list; hot pressed sq. and hex. blank nuts, 50c. off list; tapped nuts, list; cold pressed sq. and hex. blank nuts, list plus \$1; semi-finished hex. nuts, 40 per cent off list.

Old Material.—The scrap market is weak and dull. Heavy melting steel is slightly lower and shoveling turnings and mixed borings and turnings have declined about 50c. a ton. A local consumer is understood to have purchased during the week several thousand tons of steel-making scrap, which will come from the sellers' yard stocks, but with this exception all trading was between dealers. Dealers are paying \$25 to \$27.25 for heavy melting steel, depending on the specifications, for Cleveland, Youngstown and Canton delivery, and are offering \$18 for borings and turnings but expect

prices on the latter grade to go lower. One dealer is in the market for compressed steel at \$23.50 and for railroad malleable at \$32.50. The price on the latter grade has declined. Stove plate is firmer.

Dealers quote delivered consumers' yards in Cleveland and vicinity as follows:

Heavy melting steel.....	\$27.00 to 27.25
Steel rails, under 3 ft.....	30.00 to 31.00
Steel rails, rerolling.....	39.00 to 40.00
Iron rails.....	32.00 to 33.00
Iron car axles.....	41.00 to 42.00
Steel car axles.....	36.00 to 37.00
Low phos. melting scrap.....	28.00 to 28.50
Cast borings.....	17.50 to 18.00
Machin shop turnings.....	12.75 to 13.00
Mixed borings and short turnings.....	17.50 to 18.00
Short turnings for blast furnaces.....	17.50 to 18.00
Compressed steel.....	22.75 to 23.50
Railroad wrought.....	28.00 to 29.00
Railroad malleable.....	32.25 to 33.00
Steel axle turnings.....	22.00 to 23.00
Light bundle sheet scrap.....	15.00 to 16.00
Drop forge flashings over 10 in.....	19.00 to 20.00
Drop forge flashings under 10 in.....	19.00 to 20.00
No. 1 cast.....	40.00 to 41.00
No. 1 busheling.....	19.00 to 20.00
Railroad grate bars.....	30.00 to 31.00
Stove plates.....	28.50 to 29.00
Cast-iron wheels.....	39.00 to 40.00
Pipes and flues.....	24.50 to 25.00

Philadelphia

PHILADELPHIA, Sept. 14.

A perceptible easing up in the steel situation is in evidence. This is due principally to the better movement of steel by the railroads, but the slowing up of various lines of manufacture, notably the automotive industries, has also been an important factor. The new business offered to the mills is in relatively small volume. Many buyers who are covered on contracts, but who were forced into the open market because of non-delivery on their contracts, are now getting ample shipments, and the spot demand which flourished at the high prices asked by independent mills has gradually melted away in recent weeks, until now some of the Eastern mills, particularly those making plates and shapes, are close to the point where they need additional tonnage. While plates and shapes are in the weakest position with regard to tonnages booked, the demand for bars, sheets and wire products has also fallen off to some extent. However, in these latter three products most of the mills have business for at least three or four months, and the situation has changed only insofar as new business is concerned.

Lack of railroad buying has been a disappointment to makers of plates and shapes, who had hoped that orders from that source would take up some of the present slack in other directions. Despite the apparent need of plates, shapes and bars for car building and repairs, there is virtually no demand from Eastern roads for these products. Track materials have been bought fairly freely, and an interest is now being shown in rails. The Norfolk & Western has an inquiry out for 15,000 to 20,000 tons of heavy rails for this year's rolling, and the Baltimore & Ohio has put out a "feeler" for 100,000 tons for next year. One producer of rails is quoting \$75 a ton on open hearth, while others are reported to be well sold up for this year.

Pig Iron.—Prices remain firm despite a diminishing demand. Eastern furnaces are oversold for this year and will carry considerable of their business over into next year. It is estimated that the total tonnage on the books of eastern Pennsylvania furnaces is equal to eight months' production at the August rate of output. Much of this business was taken at prices which appear very reasonable compared with present market quotations; hence furnace men do not look for any unwillingness on the part of consumers to take the iron as shipped. There is an easing up in the pig iron situation only so far as shipments are concerned. Some foundries which a short time ago were not very particular about the analysis of the iron they received are now getting sufficient shipments and are more exacting in demanding the grade of iron for which they contracted. There is some inquiry for foundry iron for first quarter, but little buying. Foundry iron prices are unchanged, ranging from \$51 to \$53, furnace,

for 1.75 to 2.25 per cent silicon. Malleable iron is offered by an Eastern furnace for shipment this year at \$54, furnace, with \$1.40 freight rate to Philadelphia. Recent sales have been at higher delivered prices, but the iron has come from outside producing districts. Low phosphorus iron remains at \$57, furnace, for copper bearing and \$60 for copper free. Basic is nominally quoted at \$50, furnace, but there is little available. One maker of basic estimates the requirements of Eastern consumers for the remainder of the year at 150,000 tons, which is considerably above the current rate of production in this district. More furnaces will come into blast soon. The Brooke furnace, which has been out for relining, will be relighted Wednesday. The large Crane furnace, which has been out for a year for rebuilding, will be in blast in a week or so. The Alan Wood Iron & Steel Co. will have its No. 2 furnace in blast again as soon as supply of coke is assured. The Bethlehem Steel Co. has started a furnace at Lebanon and one at Steelton since the first of the month and the Reading Iron Co. has resumed furnace operation. One of the Wharton stacks at Wharton, N. J., will be in blast about Dec. 1 and its output is now being offered for sale. The second Wharton furnace will not come in until next February. The new Thomas furnace at Hokendauqua will be in blast about Jan. 1, according to present expectations. Coke is in better supply and the Eastern furnace output for the remainder of the year should at least equal the August production, which showed a gain over preceding months. Some resale iron is appearing in the market, but the tonnages are not sufficient to be much of a factor.

The following quotations are for iron delivered in consumers' yards in Philadelphia or vicinity, except those for low phosphorus iron, which are f.o.b. furnace:

East. Pa. No. 2 plain, 1.75 to 2.25 sil.	\$52.26 to \$52.54
East. Pa. No. 2X, 2.25 to 2.75 sil.	53.51 to 53.79
Virginia No. 2 plain, 1.75 to 2.25 sil.	55.47
Virginia No. 2X, 2.25 to 2.75 sil.	56.72
Basic deliv. Eastern Pa.	51.26 to 51.52
Gray forge (nominal).	47.10 to 48.50
Standard low phos. (f.o.b. furnace).	60.00
Malleable	55.40 to 57.71
Copper bearing low phos. (f.o.b. furnace)	57.00

Ferroalloys.—The demand for ferromanganese is small. No sales of importance are reported. Both British and American ferromanganese are available at \$170, c.i.f. Atlantic seaboard. This price has been shaded, it is reported, on resale lots. Spiegeleisen is quoted at \$82.50 and \$85, furnace, by Eastern makers.

Semi-Finished Material.—Open hearth rerolling billets are fairly easy at \$60, Pittsburgh, while forging billets are somewhat firmer at \$75, Pittsburgh.

Rails.—The Norfolk & Western Railroad is in the market for 15,000 to 20,000 tons of heavy rails for this year's shipment and the Baltimore & Ohio Railroad has put out an informal inquiry for 100,000 tons for next year. Most of the rail mills are reported to be well sold up for this year, but one producer is able to make deliveries, its price being \$75 mill, for open hearth.

Plates.—Some of the Eastern plate manufacturers evidence an inclination to reduce operations rather than accept business at prices in which they claim there is no profit. While current transactions are few, they do not reflect any strengthening in the market, 3.25c., Pittsburgh, now appearing more frequently. We note the sale of 1000 tons of ship plates to a Baltimore shipbuilder at this price and the Lloyds extra of 10c. per 100 lb. was waived. Some mills are getting 3.50c., Pittsburgh, apparently without difficulty, on smaller lots. There is not sufficient plate business to thoroughly test the price situation. We quote sheared and universal plates at 3.25c. to 3.50c., Pittsburgh.

Shapes.—Current business is made up of small lots for fairly early shipment, fabricators being the principal buyers. No railroad work of importance is up, and building construction involving steel is almost negligible in this district. We quote plain material at 3.10c. to 3.25c., Pittsburgh. On small shapes, 3.50c. is sometimes obtained.

Bars.—While bar mills have a fair volume of busi-

ness booked ahead, in some instances covering several months' output, current demand has fallen off appreciably. Large sizes are available at 3.75c., Pittsburgh, where 4c. had been recently quoted. One company reports sales of scattered lots totaling 1500 tons in the past week at 4c., Pittsburgh, but sales have been made by one small mill in this district at 3.50c., and a Pittsburgh mill has sold at 3.25c. in numerous instances. There is a scarcity of bar iron, due to continued strikes of workmen at two of the larger Eastern mills. One producer whose output has not been affected is now taking care of regular trade only at 4.50c. base, Pittsburgh, and quotes 4.75c. to 5c., Pittsburgh, to other buyers.

Sheets.—There is a fairly good inquiry for sheets, but prices are easing up somewhat. Blue annealed sheets are available at from 5.50c. to 6.50c., Pittsburgh, the former price representing heavier gages. Black sheets are quoted at 7c., Pittsburgh, and galvanized sheets at 8.25c. to 8.50c., Pittsburgh, these being base prices.

Old Material.—The market is quiet. Such sales as are being made are usually at advancing prices. Low phosphorus melting stock, car wheels, railroad and yard wrought and cast borings are higher. We quote for delivery at consumer's plant in this district as follows:

No. 1 heavy melting steel.....	\$26.50 to \$27.00
Steel rails rerolling.....	39.00 to 40.00
No. 1 low phos., heavy 0.04 and under.....	35.00 to 36.00
Car wheels.....	43.00 to 45.00
No. 1 railroad wrought.....	34.00 to 35.00
No. 1 yard wrought.....	31.00
No. 1 forge fire.....	18.00 to 19.00
Bundled skeleton.....	18.00 to 19.00
No. 1 busheling.....	20.00 to 21.00
No. 2 busheling.....	17.00 to 18.00
Turnings (short shoveling grade for blast furnace use).....	19.00 to 20.00
Mixed borings and turnings (for blast furnace use).....	18.00 to 19.00
Machine-shop turnings (for rolling mill and steel works use).....	20.00 to 21.00
Heavy axle turnings (or equivalent).....	21.00 to 22.00
Cast borings (for rolling mills).....	24.00 to 25.00
Cast borings (for chemical plants).....	24.00 to 25.00
No. 1 cast.....	40.00 to 42.00
Railroad grate bars.....	30.00 to 31.00
Stove plate (for steel plant use).....	28.00 to 29.00
Railroad malleable.....	28.00 to 29.00
Wrought iron and soft steel pipes and tubes (new specifications).....	24.00 to 25.00
Iron car axles.....	45.00 to 46.00
Steel car axles.....	42.00 to 44.00

British Iron and Steel Market

Belgium Cutting Prices—Northeastern Steel Makers Advance Prices 20s. Per Ton

(By Cable)

LONDON, ENGLAND, Sept. 14.

The labor position is precarious. A complete stoppage of electric power is threatened.

The Cleveland pig iron situation is unchanged. Buyers and sellers are awaiting developments in the coal crisis. Producers are now open to sell forge qualities of iron for export, but there is no market for this material. The release is expected of small quantities of foundry iron for export in the near future. Makers of hematite iron have such solid order books that they are reluctant to book new business. Prices are unaltered.

Foreign ore is dull. The best Bilbao Rubio is quoting at 47s. to 48s. ex-ship, Tees.

Northeastern steel makers have advanced all prices except rails and fish plates by 20s. per ton, but the advances apply only to old contracts made with a fluctuation clause. Belgian works are cutting prices in an endeavor to secure business. They are quoting channels 110 fr.; beams, 105 fr.; angles, 115 fr.; flats up to 2 in., 112.50 fr.; small tees, 137.50 fr.; sheets, 1/8 in., 150 fr.; 1/16 in., 155 fr.; No. 18 gage, 160 fr., all per 100 kg.

Tin plates are firmer, but there is little business. Buyers and sellers are awaiting the coal mine labor developments. A complete stoppage is threatened of the open hearth plants in Wales by the action of the electrical trades union. Galvanized sheets are weaker.

We quote per gross ton except when otherwise

stated, f.o.b. maker's works, with American equivalent figured at \$3.46 for £1, as follows:

Ship plates	£26	0 to £33	0	\$89.96 to \$114.18
Boiler plates	30	0 to 35	0	103.80 to 121.10
Tees	26	10 to 32	0	91.69 to 110.72
Channels	25	15 to 31	5	89.10 to 108.13
Beams	25	10 to 32	0	88.23 to 110.72
Round bars, 3/4 to 3 in.	28	0 to 33	10	96.88 to 115.91
Rails, 60 lb. and up.....	25	0 to 27	0	86.50 to 93.42
Billets	22	0 to 24	0	76.12 to 83.04
Sheet and tin plate bars.				
Welsh	23	10		81.31
Galvanized sheets, 24 g.	41	0		141.86
Black sheets, 24 g. to 26 g.	50	0 to 54	0	173.00 to 186.84
Tin plate base box*	2	19		10.20
Steel hoops	38	15 to 39	0	134.08 to 134.94
Cleveland basic iron	11	15		40.6C
West Coast hematite	15	15		54.50
Cleveland No. 3 foundry	11	5		38.93
Ferromanganese	35	0 to 40	0	121.10 to 138.40
Coke	3	2 3/4		10.86

*Prompt delivery; for Nov.-Dec. 55s. (\$9.52).

The Threatened Coal Strike and Plant Operation—Export Business Falling Off—Higher Pig Iron

LONDON, ENGLAND, Aug. 30.—There has been a definite announcement as to the extent to which prices of Cleveland pig iron will be advanced on Sept. 1 to cover the increased cost of raw material. The increase amounts to 7s. 6d. per ton, so that No. 1 Cleveland will now stand at 237s. 6d. and No. 3 G. M. B. and all inferior grades at 225s. Now that the worst is known there seems to be a feeling of relief, and in many quarters the increase was expected to be even greater, so that the intimation came as a pleasant surprise. In the meantime, as all the production is required to meet home requirements, no prices for export are being made, but in fixing the prices at the levels mentioned, it appears that the iron masters had in view the fact that the time would come again when they would be seeking foreign business, and they apparently did not want to make prices too high.

The exact effects of the rise are a little difficult to foresee but in some quarters it is anticipated that the increased cost of transport on the iron itself may have the effect of diminishing the demand for Cleveland from such parts of the country as have a fairly long railroad carriage. It is generally anticipated that the increased rates will have the effect of increasing the quantities which are moved to Scotland by water. In regard to hematite, producers have not found it necessary to make any alteration in prices in view of the advance of railroad rates having been offset by the recent decline in prices of foreign ore. East Coast Mixed numbers stand at 260s. for home and 265s. for export to allied countries. The tendency recently was naturally for buyers to try and get all the iron possible before the new rates come into operation and, owing to the stoppage of certain works in the North of England for holidays, rather more iron seems to have been available for the market in certain directions.

It is reported from Australia that the works of John Lysaght (Australia), Ltd., for the manufacture of corrugated and plain galvanized and black steel sheets are expected to start operations in September, while Rylands, Ltd., who propose to manufacture wire netting, etc., has entered into arrangements to take raw materials from the Broken Hill Proprietary Co. and anticipates starting a first unit early next year. It is stated that negotiations are well advanced for the manufacture of tin plates and steel tubes besides the establishment of other subsidiary industries. The Proprietary company itself has already further extensions of its iron and steel plant in hand which it is estimated will take two years to complete. In regard to Messrs. Vickers, Ltd., the directors announce that the question of interim dividend on the ordinary shares will be settled when the accounts of 1916 to 1919 inclusive are ready for presentation to shareholders. It is reported that both Vickers and Armstrong Whitworth have experienced much difficulty in reaching a settlement with the various government departments involved in the varied war work carried out and are in a similar position in the matter of belated accounts.

Non-Ferrous Metals

The Week's Prices

	Cents Per Pound for Early Delivery							
	Copper, New York		Tin		Lead		Zinc	
	Lake	troytic	New	New	St.	New	St.	Louis
Sept. 8	18.75	18.75	44.75	8.37 1/2	8.62 1/2	7.80	7.80	
9	18.75	18.75	44.75	8.37 1/2	8.62 1/2	7.75	7.75	
10	18.75	18.75	45.00	8.37 1/2	8.62 1/2	7.75	7.75	
11	18.75	18.75	44.75	8.37 1/2	8.62 1/2	7.75	7.75	
13	18.75	18.75	45.00	8.37 1/2	8.25	7.80	7.80	
14	18.75	18.75	44.75	8.37 1/2	8.25	7.80	7.80	

NEW YORK, Sept. 14.

The markets are all inactive with the price tendency in some steady and in others downward. Buying of copper continues very light but inquiries for third quarter are more numerous. Tin consumers are more active than they have been for some time. Both the lead and zinc markets are still under the influence of imported metal and prices have further declined. Antimony is a little stronger.

New York

Copper.—Buying of copper by domestic consumers is still at a low ebb, but small sales are continually being made by most of the sellers. The most important fact is that inquiries from both large and small consumers for delivery in the third quarter is more general than for some time and this is considered an encouraging sign. The London market has also advanced considerably in recent weeks until now it is about £15 per ton higher than in June. Those well posted consider this an important sign. The opinion is quite general that a buying movement will materialize in the very near future, and the fact that copper has been very steady around 19c. for the last few months is considered somewhat remarkable. The volume of business for export continues quite satisfactory. Most of the leading producers of both Lake and electrolytic copper are willing to accept business for September or early delivery at 18.75c., New York, and are asking 19c. for later positions this year. It is also possible to buy small amounts from small producers and dealers at around 18.50c., New York, and in some cases a little lower. An interesting fact is that in the case of some companies stocks have declined each month this year. Exports in July were 19,232 gross tons, exclusive of those to Canada, which should bring the total to over 20,000 tons.

Tin.—The feature of this market, which is considered encouraging, is that consumers are evidently beginning to buy. There was further buying during the week for future shipment metal by both dealers and consumers, mostly the latter, and the quantity which changed hands is believed to have been considerable. It is regarded as significant that several large tin plate makers were among both inquirers and purchasers. Most of the business is understood to have been taken by two importers with other sellers not particularly busy. On the whole the market has been quiet. There have been further sales of contracts under the rule on the New York Metal Exchange, several lots of 25 and 50 tons each being involved, some of it Chinese tin going at around 41c. Total sales of all descriptions the last week on the New York Metal Exchange have been around 250 tons, most sales, however, having been made last Friday or yesterday. Total deliveries of the metal for the month of August were 3745 tons with 3256 tons in stocks and landing on Aug. 31. Total imports for the first eight months this year have been 36,688 tons as compared with 11,556 tons to Sept. 1, 1919. Arrivals this far in September have been 2700 tons with the quantity afloat reported as 4675 tons.

Lead.—The principal development in this market was the reduction on Monday of the price of the American Smelting & Refining Co. of 1/2c. per lb. to

8.25c., St. Louis, or 8.50c., New York. This was not unexpected by some and is a readjustment of the leading interest's quotation to the outside market. The importation of lead from England and other countries is still a dominant factor, it being possible to import lead and sell it at a profit, duty paid, at 8c., New York. With exchange at \$3.48 and the London price at £35, the actual cost is 7.40c. per lb., showing that a very good profit is possible under such conditions. Demand, however, on the whole is very light, which in fact is admitted by some producers. There are also indications of a decline in consumption. Under these conditions we quote the market at 8.25c., St. Louis, or 8.37 1/2c., New York.

Zinc.—There are two developments of importance—one is more activity on the part of galvanizers, some of it resulting in purchases, and the other is the probability that the effect of imported resale metal from England has about reached the end. Prime Western for early delivery has sold at 7.80c., St. Louis, which with the new freight rate means 8.30c., New York. The fact that some imported metal is still available at seaboard at around 7.75c. to 7.80c. still has some effect on the market. Because of this unusual situation we quote the market for prime Western for early delivery at 7.80c., St. Louis, and 7.80c. to 7.85c., New York. It is stated that metal for shipment from the West and imported metal can be delivered in the Pittsburgh district at close to the same price.

Antimony.—Wholesale lots for early delivery are quoted at 7.12 1/2c., New York, duty paid with jobbing lots at 7.37 1/2c. to 7.50c.

Aluminum.—Considerable quantities of virgin metal are being offered as low as 30c., New York, but the price of the leading interest remains unchanged at 34.90c., f.o.b. producer's plant.

Chicago

SEPT. 14.—All of the markets are inactive and tin, lead and spelter have suffered further declines. While there is known to be a large amount of business pending, buyers are evidently deferring purchases until they are satisfied that prices have reached bottom. Although the foreign tin market has shown strength, the local market has not responded. We quote Lake copper at 19c. to 19.25c., in carload lots; tin, 47c. to 48c.; lead, 8.75c.; spelter, 7.90c.; antimony, 8.50 to 9c. On old metal we quote copper wires, crucible shapes, 13c.; copper clips, 13c.; copper bottoms, 11c.; red brass, 13c.; yellow brass, 8.50c.; lead pipe, 6c.; zinc, 4c.; pewter, No. 1, 22.50c.; tin foil, 27.50c.; block tin, 32.50c.; all these being buying prices for less than carload lots.

St. Louis

SEPT. 13.—The non-ferrous metals have been easier during the week, with some recession in lead and spelter, which were quoted, in car lots, as follows: Lead, 8.75c.; spelter, 7.90c.; while in less than car lots the prices were: Lead, 9.25c.; spelter, 8.40c. to 8.50c.; tin, 56c.; copper, 19c.; antimony, 9.50c. In the Joplin district ores were off somewhat because of the drop in metals and the disinclination of buyers to take in any large quantities, although one buyer paid as high as \$50 for premium grade zinc blend, basis 60 per cent, and lead in the earlier part of the week sold as high as \$112.50 for 80 per cent. Calamine stood at \$35 to \$38 per ton, basis 40 per cent. On miscellaneous scrap metals we quote dealers' buying prices as follows: Light brass, 8c.; heavy yellow brass, 10c.; heavy red brass and heavy copper and copper wire, 14c.; light copper, 12c.; zinc, 4.50c.; lead, 6.50c.; tea lead, 3c.; pewter, 25c.; tinfoil, 38c.; aluminum, 20c.

Barton Shover, consulting engineer, Pittsburgh, has been retained by the Collins Co., Collinsville, Conn., in connection with the installation of a bar mill and steel works equipment to be installed by the company. This company makes axes, hatchets, matchets, etc., largely for export.

Prices Finished Iron and Steel, f.o.b. Pittsburgh

Freight Rates

Freight rates from Pittsburgh on finished iron and steel products, in carload lots, to points named, per 100 lb., are as follows:

Philadelphia	\$0.35	St. Paul	0.695
New York	0.38	Omaha	0.815
Boston	0.415	Omaha (pipe)	0.785
Buffalo	0.295	Denver	1.35
Cleveland	0.24	Pacific Coast	1.665
Cincinnati	0.33	Pacific Coast, ship	1.335
Indianapolis	0.345	plates	1.335
Chicago	0.38	Birmingham	0.765
St. Louis	0.475	Jacksonville, all rail	0.555
Kansas City	0.815	Jacksonville, rail and water	0.46
Kansas City (pipe)	0.785	New Orleans	0.515

The minimum carload to most of the foregoing points is 30,000 lb. To Denver the minimum loading is 40,000 lb., while to the Pacific Coast on all iron and steel products, except structural material, the minimum is 80,000 lb. On the latter item the rate applies to a minimum of 50,000 lb., and there is an extra charge of 9c. per 100 lb. on carloads of a minimum of 40,000 lb. On shipments of wrought iron and steel pipe to Kansas City, St. Paul, Omaha and Denver, the minimum carload is 46,000 lb. On iron and steel items not noted above the rates vary somewhat and are given in detail in the regular railroad tariffs.

Structural Material

I-beams, 3 to 15 in.; channels, 3 to 15 in., angles, 3 to 6 in., on one or both legs, $\frac{1}{4}$ in. thick and over, and zees, structural sizes, 2.45c. to 3.25c.

Wire Products

Wire nails, \$3.25 to \$4.50 base per keg; galvanized, 1 in. and longer, including large-head barbed roofing nails, taking an advance over this price of \$1.50 to \$2 and shorter than 1 in. \$2 to \$2.50. Bright basic wire, \$3 to \$4 per 100 lb.; annealed fence wire, Nos. 6 to 9, \$3.25 to \$4.25; galvanized wire, \$3.70 to \$4.70; galvanized barbed wire and fence staples, \$4.10 to \$5.10; painted barbed wire, \$3.40 to \$4.45; polished fence staples, \$3.40 to \$4.50; cement-coated nails, per count keg, \$2.85 to \$4.10; these prices being subject to the usual advances for the smaller trade, all f.o.b. Pittsburgh. Freight added to point of delivery, terms 60 days net, less 2 per cent off for cash in 10 days. Discounts on woven-wire fencing are 55 to 60 per cent off list for carload lots, 54 to 59 per cent for 1000-rod lots, and 53 to 58 per cent for small lots, f.o.b. Pittsburgh.

Bolts, Nuts and Rivets

Large structural and ship rivets	\$4.50 to \$5.00 base
Large boiler rivets	4.60 to 5.00 base
Small rivets	40 per cent off list
Small machine bolts, rolled threads	.25 and 10 per cent off list
Same sizes in cut threads	25 per cent off list
Longer and larger sizes of machine bolts	.25 per cent off list
Carriage bolts, $\frac{3}{8}$ -in. x 6-in.:	
Smaller and shorter, rolled threads	20 per cent off list
Cut threads	20 per cent off list
Longer and larger sizes	20 per cent off list
Lag bolts	40 per cent off list
Flow bolts No. 1, 2 and 3 head	35 per cent off list
Other style heads	20 per cent extra
Machined bolts, c.p.c. and t. nuts $\frac{3}{8}$ -in. x 4-in.:	
Smaller and shorter	10 per cent off list
Longer and larger sizes	10 per cent off list
Hot pressed and cold pressed sq. or hex. blank nuts	
Tapped nuts	\$1.00 off list
C. P. C. & L. sq. or hex. nuts, blank	40 per cent off list
C. P. C. & L. sq. or hex. nuts, tapped	40 per cent off list
Semi-finished hex. nuts, U. S. S. and S. A. E.:	
$\frac{5}{16}$ -in. and larger	40 per cent off list
$\frac{9}{16}$ -in. and smaller	40 per cent off list
Stove bolts in packages	.60 and 10 per cent off list
Stove bolts in bulk	.60, 10 and $\frac{2}{3}$ per cent off list
Tire bolts	50 per cent off list
Track bolts	7c, base
Iron cap screws	40 per cent off list
Set screws	10 and 10 per cent off list
One cent per lb. extra for less than 200 kegs. Rivets in 100-lb. bags 25c. extra.	

All prices carry standard extras f.o.b. Pittsburgh.

Wire Rods

No. 5 common basic or Bessemer rods to domestic consumers, \$75 to \$80; chain rods, \$75 to \$80; screw stock rods, \$85 to \$95; rivet and bolt rods and other rods of that character, \$75 to \$80; high carbon rods, \$85 to \$100, depending on carbon.

Railroad Spikes and Track Bolts

Railroad spikes, 9/16-in. and larger, \$4 to \$4.25 per 100 lb. in lots of 200 kegs of 200 lb. each or more; spikes, $\frac{1}{4}$ -in., 8-in. and 7 1/16-in., \$4.40 to \$4.75; 5/16-in., \$5 to \$5.50; track bolts, 57. Boat and barge spikes, \$4.40 to \$4.75 per 100 lb. in carload lots of 200 kegs or more, f.o.b. Pittsburgh. Tie plates, \$3 to \$4 per 100 lb.

Terne Plates

Prices of terne plates are as follows: 8-lb. coating, 200 lb., \$12.80 per package; 8-lb. coating, I. C., \$14.10; 12-lb. coating, I. C., \$15.80; 15-lb. coating, I. C., \$16.80; 20-lb. coating, I. C., \$18.00; 25-lb. coating, I. C., \$19.30; 30-lb. coating, I. C., \$20.30; 35-lb. coating, I. C., \$21.30; 40-lb. coating, I. C., \$22.30 per package, all f.o.b. Pittsburgh, freight added to point of delivery.

Iron and Steel Bars

Steel bars at 2.35c. to 4c. from mill. Common bar iron, 4.75c.

Wrought Pipe

The following discounts are to jobbers for carload lots on the Pittsburgh basing card:

Butt Weld

Steel	Inches	Black	Galv.	Iron	Inches	Black	Galv.
1 $\frac{1}{2}$, $\frac{3}{4}$ and $\frac{5}{8}$	47 to 50 $\frac{1}{2}$	20 $\frac{1}{2}$ to 24	3 $\frac{1}{2}$	15 $\frac{1}{2}$ to 25 $\frac{1}{2}$	+1 $\frac{1}{2}$ to 11 $\frac{1}{2}$		
2	50 to 53 $\frac{1}{2}$	37 $\frac{1}{2}$ to 39	4 $\frac{1}{2}$	19 $\frac{1}{2}$ to 29 $\frac{1}{2}$	1 $\frac{1}{2}$ to 11 $\frac{1}{2}$		
2 $\frac{1}{2}$ to 6	51 to 54 $\frac{1}{2}$	36 $\frac{1}{2}$ to 40	5 $\frac{1}{2}$	20 $\frac{1}{2}$ to 30 $\frac{1}{2}$	2 $\frac{1}{2}$ to 14 $\frac{1}{2}$		
7 to 12	47 to 50 $\frac{1}{2}$	33 $\frac{1}{2}$ to 37	7 to 12	19 $\frac{1}{2}$ to 27 $\frac{1}{2}$	6 $\frac{1}{2}$ to 14 $\frac{1}{2}$		
13 and 14	37 $\frac{1}{2}$ to 41						
15	35 to 38 $\frac{1}{2}$						

Lap Weld

Butt Weld, extra strong, plain ends	Lap Weld, extra strong, plain ends
1 $\frac{1}{2}$, $\frac{3}{4}$ and $\frac{5}{8}$	43 to 46 $\frac{1}{2}$ 25 $\frac{1}{2}$ to 29
2	47 to 50 $\frac{1}{2}$ 34 $\frac{1}{2}$ to 38
2 $\frac{1}{2}$ to 6	50 to 53 $\frac{1}{2}$ 37 $\frac{1}{2}$ to 41
7 to 12	47 to 50 $\frac{1}{2}$ 33 $\frac{1}{2}$ to 37
13 and 14	37 $\frac{1}{2}$ to 41
15	35 to 38 $\frac{1}{2}$

Lap Weld, extra strong, plain ends

Butt Weld, extra strong, plain ends	Lap Weld, extra strong, plain ends
1 $\frac{1}{2}$, $\frac{3}{4}$ and $\frac{5}{8}$	+17 +50
2	13 $\frac{1}{2}$ to 23 $\frac{1}{2}$ 6 $\frac{1}{2}$ to +3 $\frac{1}{2}$
2 $\frac{1}{2}$	18 $\frac{1}{2}$ to 28 $\frac{1}{2}$ 5 $\frac{1}{2}$ to 15 $\frac{1}{2}$
3 to 4	24 $\frac{1}{2}$ to 34 $\frac{1}{2}$ 9 $\frac{1}{2}$ to 19 $\frac{1}{2}$

To the large jobbing trade an additional 5 per cent is allowed over the above discounts, which are subject to the usual variations in weight of 5 per cent.

On butt and lap weld sizes of black iron pipe, discounts for less than carload lots to jobbers have been seven (7) points lower (higher price) than carload lots and on butt and lap weld galvanized iron pipes have been nine (9) points lower (higher price).

Boiler Tubes

The following are the prices for carload lots f.o.b. Pittsburgh:

Lap Welded Steel

3 $\frac{1}{2}$ to 4 $\frac{1}{2}$ in.	15 to 40 $\frac{1}{2}$
2 $\frac{1}{2}$ to 3 $\frac{1}{4}$ in.	10 to 30 $\frac{1}{2}$
2 $\frac{1}{4}$ in.	4 to 24
1 $\frac{1}{2}$ to 2 in.	+1 $\frac{1}{2}$ to 19 $\frac{1}{2}$

Charcoal Iron

1 $\frac{1}{2}$ and 1 $\frac{3}{4}$ in.	+20
2 and 2 $\frac{1}{4}$ in.	+10
2 $\frac{1}{2}$ and 2 $\frac{3}{4}$ in.	+1
3 and 3 $\frac{1}{4}$ in.	-1 $\frac{1}{2}$
3 $\frac{1}{2}$, 4 and 4 $\frac{1}{2}$ in.	-8

Standard Commercial Seamless—Cold Drawn or Hot Rolled

Per Net Ton	Per Net Ton
1 in.	\$327
1 $\frac{1}{4}$ in.	267
1 $\frac{3}{4}$ in.	257
1 $\frac{1}{2}$ in.	207

Per Net Ton

These prices do not apply to special specifications for locomotive tubes nor to special specifications for tubes for the Navy Department which will be subject to special negotiations.

Sheets

Prices of the Steel Corporation for mill shipments on sheets of United States standard gage in carloads and larger lots for indefinite delivery are given in the left-hand column. For reasonably prompt delivery, mills are getting up to the prices quoted in the right-hand column:

Blue Annealed

Nos. 8 and heavier	Cents per lb.
Nos. 9 and 10 (base)	3.50 to 7.20
Nos. 11 and 12	3.55 to 7.5
Nos. 13 and 14	3.60 to 7.30
Nos. 15 and 16	3.65 to 7.35

Box Annealed, One Pass Cold Rolled

Nos. 17 to 21	4.15 to 8.05
Nos. 22 to 24	4.20 to 8.10
Nos. 25 and 26	4.25 to 8.15
No. 27	4.30 to 8.20
No. 28 (base)	4.35 to 8.25
No. 29	4.45 to 8.35
No. 30	4.55 to 8.45

Galvanized Black Sheet Gage

Nos. 10 and 11	4.70 to 8.50
Nos. 12 to 14	4.80 to 8.60
Nos. 15 and 16	4.95 to 8.75
Nos. 17 to 21	5.10 to 9.00
Nos. 22 to 24	5.25 to 9.05
Nos. 25 and 26	5.40 to 9.20
No. 27	5.55 to 9.35
No. 28 (base)	5.70 to 9.50
No. 29	5.95 to 9.75
No. 30	6.20 to 10.00

Tin-Mill Black Plate

Nos. 15 and 16	4.15 to 7.80
Nos. 17 to 21	4.20 to 7.85
Nos. 22 to 24	4.25 to 7.90
Nos. 25 to 27	4.30 to 7.95
No. 28 (base)	4.35 to 8.00
No. 29	4.40 to 8.05
No. 30	4.45 to 8.10
Nos. 30 $\frac{1}{2}$ and 31	4.50 to 8.15

PERSONAL

Agnew T. Dice, Jr., has been placed in charge of the cut nail business of the Reading Iron Co., Reading, Pa. He was graduated from Princeton eight years ago, and spent six years with the Philadelphia & Reading Railway Co. He joined the Reading company last year as railroad sales manager, which position he continues to fill.

R. M. Wallace has resigned from the Republic Iron & Steel Co., at Youngstown, Ohio, to engage in business. He was previously employed by the American Sheet & Tin Plate Co. at Pittsburgh, and was at one time chief clerk of the Morgan Spring Co. at Struthers, Ohio.

Col. Paul R. Hawkins, Springfield, Mass., has been made district representative in Pittsburgh for the Norton Co., Worcester, Mass., grinding wheels, etc.

William A. Leonard, Chicago, has been elected vice-president and general manager of the Imperial Brass Mfg. Co., that city, maker of oxy-acetylene welding equipment, plumbing supplies, and a general line of automobile accessories and brasswork. Until recently he was with Belding Brothers & Co., Chicago and New York, as organization and sales promotion manager.

Walter F. Shulz, for the past year production manager and chief engineer at the Wheatland, Pa., plant of the Sharon Pressed Steel Co., Sharon, Pa., has resigned to become identified with the operating department of the Truscon Steel Co., Youngstown, Ohio. His successor is O. C. Steinert, who has been assistant engineer. Mr. Shulz was formerly connected with the Savage Arms Corporation.

P. V. Vernon, a director and chief designer of Alfred Herbert, Ltd., of England, manufacturer of machine tools, has arrived in New York to visit the American branch at 54 Dey Street.

George T. Aitken, sales manager Frontier Chuck & Tool Co., Buffalo, N. Y., has resigned to accept the position of manager of the Buffalo, N. Y., office of Reed-Prentice Co.-Whitcomb-Blaisdell Machine Tool Co.-Becker Milling Machine Co., with headquarters at 256 Main Street, Associated Service Building. The salesroom there will carry a stock of machine tools and cutters.

C. B. Lord, formerly general superintendent Wagner Electric & Mfg. Co., St. Louis, has become works manager of the Advance-Rumely Co., Battle Creek, Mich., agricultural implements.

At a meeting of the directors of the American Seeding Machine Co., Springfield, Ohio, Sept. 8, James A. Carr, Richmond, Ind., former president, was elected chairman of the board of directors, and Frank C. Johnson, Springfield, Ohio, former vice-president, was elected to the presidency.

W. LaCoste Neilson, vice-president and foreign manager the Norton Co., Worcester, Mass., grinding wheels, etc., whose headquarters are in London, and C. A. Runo, the Leicester, Eng., representative of the company, attended the annual sales conference at Worcester the week beginning Sept. 13.

Henry H. Soule has been appointed general manager of the Bollstrom Motors, Inc., St. Louis, Mich. He is also vice-president of the Gratiot Foundry Co.

J. D. Siddeley, managing director Armstrong-Siddeley Motors, Ltd., Coventry, England, manufacturer of the Armstrong-Siddeley car, is spending a month in the United States visiting automobile factories and studying problems of production. During the war the Siddeley company was one of the large manufacturers of aviation engines for the British Government and since the war it has been engaged in the development and production of automobiles.

H. C. Workmaster, for 12 years credit manager of the Harris Pump & Supply Co., Pittsburgh; O. C.

Jacobs and J. R. Balsly, who also were identified with the Harris company, have organized the Penn Mill & Mine Supply Co., which occupies the building at 523 First Avenue, Pittsburgh, containing offices and storehouse.

F. L. Mowder, formerly comptroller of the Toledo Scale Co., has been appointed comptroller of the Handley-Knight Co., Kalamazoo, Mich., which will go into the production of passenger automobiles early in October.

William J. McRell has been made superintendent of the perforating, spiral weaving and electroplate departments of the Wickwire-Spencer Steel Corporation mills, Clinton, Mass.

Herbert E. Cushman, treasurer Morse Twist Drill & Machine Co., New Bedford, Mass., will preside at a dinner of the Boston Export Round Table, composed of New England exporters, on Sept. 17. He is a member of the Massachusetts State Commission on Foreign and Domestic Commerce, recently appointed by Governor Coolidge. The speaker at this dinner will be W. P. F. Ayer, vice-president Walworth Mfg. Co., on "Training Men for Foreign Trade."

Three changes have been made in the personnel of the Timken-Detroit Axle Co., Detroit. E. E. Rutter has resigned to enter another business; A. S. Ward has been appointed assistant manager of the newly organized service division; Charles H. Brooks has been sent to the Pacific Coast to represent the production and engineering inspection department.

Charles H. Dayton, 120 Franklin Street, Boston, has been appointed district representative with the Falcon Steel Co., Niles, Ohio, in Maine, New Hampshire, Vermont, Massachusetts and Rhode Island. He will have charge of the sale of black, blue-annealed and galvanized steel sheets.

Ernest C. Rice, who started with the Advance-Rumely Co., Battle Creek, Mich., agricultural implements, 17 years ago, as a laborer, has resigned as works manager of the company to become treasurer and office manager of the Sheriff-Goslin Co., Battle Creek, which has a large paint and varnish plant, with branches in several Michigan towns.

The directors of the C. & G. Cooper Co., Mt. Vernon, Ohio, have elected B. B. Williams president to succeed D. B. Kirk, deceased. F. H. Thomas was elected vice-president to succeed Mr. Williams and N. L. Daney was elected treasurer to succeed Mr. Thomas. This makes the executive organization of the board as follows: Mr. Williams, president and general manager; Mr. Thomas, vice-president in charge of sales; Mr. Taylor, secretary in charge of production; Mr. Daney, treasurer in charge of finance and accounting. These members of the board, with five other officers of the company, constitute the committee of management. The other members of this committee are B. L. Larsen, general superintendent; P. D. Worley, purchasing agent and traffic manager; M. A. Thiel, consulting engineer, gas engine department; J. H. Debes, consulting engineer, steam engine department, and H. A. Gehres, who is in charge of steam and gas engineering. Mr. Cooper and G. S. Rentschler, Hamilton, Ohio, are members of the board of directors. The Chapman Engineering Co., the Chapman-Stein Furnace Co., and the Marion Die, Tool & Machine Co., Marion, Ohio, are subsidiaries of the Cooper company. The complete service of the combined companies now includes gas engines, Corliss engines, gas producers and furnaces.

M. T. Conklin has been elected president of the Gale Mfg. Co., Albion, Mich., manufacturer of agricultural implements.

George C. Jones, formerly with Bancroft Jones Corporation, Buffalo, has been appointed eastern sales manager of the Steel Fabricating Corporation, 1270 Broadway, New York.

Dr. Alphonse A. Adler will open an office as consulting engineer at 9 Murray Street, New York, specializing in machine, power, industrial plant design and research.

M. G. Batroch, formerly ceramic chemist McCullough Dalzell Crucible Co., Pittsburgh, has resigned to accept a position in the sales department of Laclede Christy Clay Products Co., St. Louis, in its Pittsburgh office.

Dexter A. Tutein, formerly in charge of the New York office of E. Arthur Tutein, Inc., sales agent for the Thomas Iron Co., Hokendauqua, Pa., is now resident manager of the Philadelphia office.

Henry A. Getty, for the past five years identified with the Boston office of the Columbia Steel & Shafting Co., Pittsburgh, has resigned to take the position of Boston district sales manager for the Wyckoff Drawn Steel Co., Pittsburgh. Prior to his connection with the Columbia Steel & Shafting Co., Mr. Getty was with the American Steel & Wire Co.

C. Frank Schwep, purchasing agent Ingersoll-Rand Co., New York, has returned from a European trip.

J. W. McQueen, president Sloss-Sheffield Steel & Iron Co., Birmingham, Ala., recently visited New England for the purpose of inspecting unloading facilities at Providence, R. I., and Bridgeport, Conn., where the company is shipping considerable pig iron by barge. His return South was via a cargo steamer.

William J. Hall, chief clerk, cost department American Steel & Wire Co., Worcester, Mass., has been made chief clerk, cost departments, combined, with headquarters at Cleveland.

L. G. Beck, in charge of the cloth and netting sales department, Wickwire-Spencer Steel Corporation, Worcester, Mass., has resigned.

Maurice Bulle, a captain of aviation in the French army and a graduate of Ecole Polytechnique, has joined the Compagnie des Forges et Aciéries de la Marine et d'Homécourt and in preparation for his work at the company's Homécourt plant is now in the United States studying steel manufacture.

H. A. Robinson has joined the selling organization of E. Arthur Tutein, Inc., agent for the Thomas Iron Co., Hokendauqua, Pa., and is now resident manager of the New York office. Mr. Robinson has been connected with the iron business for the past 10 years, being formerly with the Midvale Steel & Ordnance Co., and Park & Williams, Inc.

Malcolm E. Gregg, for some years sales representative at Buffalo for the Republic Iron & Steel Co. and latterly in the sales department of the Lackawanna Steel Co., has been made assistant metallurgical and inspecting engineer of the Lackawanna company, associated with Dr. George B. Waterhouse, for whom the office of metallurgical and inspecting engineer was recently created.

E. D. Pumphrey, formerly assistant district sales manager of Midvale Steel & Ordnance Co. and Cambria Steel Co. in the Detroit district, has resigned his position recently and become associated with the Donner Steel Co. as manager of sales in that district with offices in the Penobscot Building. Mr. Pumphrey was associated with the Cambria Steel Co. for 21 years, having spent the major portion of this time in the Cincinnati office.

Henry E. Bodman, an attorney representing the Republic of France, has filed in the United States district court at Detroit a suit against the Michigan Steel & Metal Co., Detroit, for the recovery of \$150,000, claimed to be due on two contracts entered into during November, 1919, for the purchase by the Detroit company of soft steel bars and steel sheets.

Directors of the Youngstown Sheet & Tube Co. have declared the quarterly cash dividend of \$1.50 on new non-par value common stock and the regular dividend of \$1.75 on preferred, both payable Oct. 1.

OBITUARY

JOHN T. COX, superintendent billet finishing department, steel works of the Interstate Iron & Steel Co., Chicago, died in a Chicago hospital Sept. 8, of kidney trouble, after a two weeks' illness. He was born in Fredericksburg, W. Va., in 1884. When a young man he entered the steel business, which he made his life's work. His early training was received at Coatesville. Subsequently, he became associated with the Bethlehem Steel Co. and the United Alloy Steel Corporation. For the past three years, he had been affiliated with the Interstate Iron & Steel Co., Chicago.

JAMES M. MAY, 71 years of age, a director of the Crucible Steel Co. of America, president of the Penn Bridge Co., Beaver Falls, Pa., and identified with a number of other industrial and financial interests, died at his home in Beaver Falls, Pa., Sept. 13. He was born in Pittsburgh and after practicing medicine for a brief period, became manager of a steel works which was absorbed by the Crucible Steel Co. of America in 1900. He was manager for about two years of the Anderson Dupuy Spring Works, McKees Rocks, Pa., a subsidiary of the Crucible Steel Co. of America.

JOSEPH S. RALSTON, president Ralston Steel Car Co., Columbus, Ohio, died Sept. 11, aged 55. He had been suffering from nervous prostration for several months. Mr. Ralston went to Columbus in 1905 from Hamilton, Ont.

CHARLES H. ROLLINS, vice-president American Wire Fence Co., Chicago, died at his home in that city Sept. 10.

Jones & Laughlin Steel Co. Warehouse

The Jones & Laughlin Steel Co. recently opened its new Pittsburgh warehouse. Ground was broken for the buildings on June 10, and all material was fabricated, erected and fully equipped with cranes, racks, etc., and placed in operation on Sept. 1. This is considered a remarkable time record, in view of the recent transportation conditions, and the difficulties surrounding the shipment of building material. The company will carry a complete stock of bars, both hot and cold rolled, wire products, spikes, and the other lighter forms of finished steel. The company was prompted to enter the warehouse business here because of the difficulty it recently experienced, and which it still is experiencing to some extent, in making mill shipments on account of the railroad and car situation, and because it was only by means of warehouse facilities that it could carry in stock and have available for the trade tributary to Pittsburgh, these lines of steel.

Will Probably Re-finance Company

The creditors of the Standard Parts Co., Cleveland, at a meeting Sept. 10 agreed to co-operate with the stockholders to enable the latter to protect their equity in the company's property. The creditors promised to make long-time extensions on their claims if the stockholders take prompt action in providing a form of refinancing that would provide at least \$6,000,000 in working capital, and the opinion was expressed that an underwriting for that amount should be undertaken within 60 days to preserve the good will of the company. It is expected that the plan of refinancing will be worked out during the present week.

Abrasive Industries Convention

The associated abrasive industries of the United States, which includes the manufacturers of grinding wheels, abrasive paper and cloth, grinding machines, power grinders, manufacturers and crushers of emery, corundum and other abrasives, will hold a convention the week of Sept. 20 at the Lake Tarleton Club, Pike, N. H. Among the speakers scheduled to appear are Irvin S. Cobb, Donald Fraser and Judge Moore.

PRICE DECLINE IN JAPAN

Prices Weaken Except in Pig Iron—Exchange Retards German Purchases

New business in the export field has almost ceased, except for a few small orders, chiefly because of declining exchange and the belief of many foreign buyers that prices are weakening. South Americans facing an exchange loss in making purchases in the United States show preference for British material, which attitude exporters believe will continue until American and other foreign markets for South American products, such as wool, hides, coffee, etc., strengthen, and greater exports from South American countries bring the exchange rates back to normal.

The recent German purchase of about 14,000 tons of ship plates and shapes by three shipyards was not sufficient to complete the ships under construction, the intention being to place additional tonnage later. The low value of the mark, however, has caused a delay, the buyers having decided to wait for a possible recovery in the exchange rate before opening dollar credits on the new orders.

Japanese Prices Decline 15 Per Cent

Some business is appearing from the Dutch East Indies, but other Far Eastern markets are quiet. Japan has experienced a decline since the middle of August. Toward the end of June the lowest prices on iron and steel were reached and there was a gradual strengthening of the market, quotations about the middle of August showing in many instances a 40 per cent increase over the low figures of June. The reaction since then has shown an average decrease of 10 to 15 per cent, with the exception of foundry iron of Japanese origin, which is holding firm at about 95 yen. The firmness is explained by fairly large exports to Pacific coast consumers at about \$60 per ton, c.i.f. port. A fair quantity of manganese ore is also being exported to the United States, and there is still some re-exporting of American material that was purchased at low prices. For example, steel bars purchased five or six months ago in the United States at 2.35c. per lb., have been successfully placed with Western buyers in the United States. The decline in the market, which is attributed partly to speculators, who began to operate as soon as there was evidence of recovery, is not considered serious, although exporters now do not look forward to any business before next spring. The following comparison of quotations on Sept. 8, and on July 29,

serves to show the slight reaction that has taken place in everything but pig iron:

	Sept. 8, Yen	July 29, Yen
Steel bars.....	150	160
Shapes	190	200
Plates	150	160
Sheets, 1/16 to 3/32 in.....	230	260
Sheets, Nos. 23 to 28.....	245	290
Sheets, No. 28 galvanized.....	470	500
Tin plate, per box.....	17	18
Wire, No. 8 galvanized.....	230	240
Nails, per keg.....	17 1/2	18
Pig iron	95	90

Some Japanese point out that Japan's difficulties are shifting from financial to industrial, and although in most lines of industry there is a surplus of labor at present, the trades unions are increasing in strength. Added to this, the attitude of a large part of the new employers produced by the war is not calculated to quiet labor unrest.

Exports from Northwest

SEATTLE, Sept. 9.—General industrial conditions in Seattle, Portland and Tacoma, Wash., continue quiet, due to the almost stoppage of business in lumber and shipbuilding, these being the leading industries of the three places named. The export trade from Seattle is also very dull, leading exporters and also selling representatives of Eastern steel mills reporting that the market is about bare of foreign inquiry. In fact, the only sizable steel inquiry for export that has come into the Seattle exporters for some time is one for 1300 tons of No. 28 gage, one pass, cold rolled sheets for shipment to Japan, and on which prices have been named by several Eastern mills through their Seattle agents.

At present black sheets as above are quoted at 8c. to 9c. per lb. from store by Seattle jobbers. The old domestic rate of freight on sheets from Pittsburgh and points taking Pittsburgh rates to Seattle was \$1.25 per 100 lb., but the new rate is \$1.665 per 100 lb., an advance of \$8.30 per ton. The export rate of freight on sheets from Pittsburgh to Seattle is 80c. per 100 lb., the steamer rate from Seattle to Japan is \$11.25 per ton, and a charge of 50c. per ton for wharfage is made in Seattle. The present rail rate on sheets and other steel products from Pittsburgh to New York is \$7.60 per net ton, and the ocean rate from New York to the Orient is \$18 per net ton.

There has been no export inquiry for tin plate in the Seattle district of any moment for some weeks. A member of a leading export house in Seattle sailed for Japan on Tuesday, Sept. 7, to look into the financial and export conditions there.

VIGOROUS PROTEST

Strong Objection to Step Toward Nationalization of Railroads

The demand of the railroad men through their labor leaders for the establishment of national boards of adjustment, which would force the railroads to deal with the unions on a national scale, is developing strong opposition, as it is contended that this is only one of the preliminary steps toward the eventual nationalization of the roads under the "Plumb Plan." It is pointed out by the Citizens' Transportation Committee, New York, that the present demand of labor leaders is entirely at variance with the intent of the transportation act of 1920 (Esch-Cummins law) and is chiefly an attempt on the part of these leaders to retain the centralized power that they enjoyed under Federal control and establish a condition that would be virtually a national closed shop for all railroad employees.

The question of the establishment of national adjustment boards is now before the Railroad Labor Board at Chicago, which consists of Judge R. M. Barton, chairman, and G. W. W. Hangar and Henry Hunt. Strong pressure is being brought to bear by labor officials and the Citizens' Transportation Committee points out that the shipping public and society in general should be heard.

The committee has sent a telegram to Judge Barton and the Merchants' Association of New York has telegraphed its opposition and requested a hearing before the board. A strong telegram of objection has also been sent by the National Erectors' Association, which represents the bulk of the structural steel industry of the country. Walter Drew, counsel of the association, in referring to the situation, says that in his opinion "it is the most important that has arisen in the industrial field since the war." The situation calls for prompt action. The railroads are weary of war and are not sure of their standing with the public and with industry. Mr. Drew adds that they should be advised in no uncertain terms that a firm stand will receive general approval and endorsement.

The purchase of 1375 all steel hopper cars of 55 tons each by the Pittsburgh & Lake Erie Railroad is made possible by the Interstate Commerce Commission's approval of the issuance of equipment trust certificates bearing 7 per cent. interest to a total value of \$2,400,000. The estimated cost of the steel cars is \$3,508,300.

Pilling & Crane, Real Estate Trust Building, Philadelphia, have been appointed sales agents for the pig iron which will be produced at the new Wharton furnaces of the Replogle Steel Co. at Dover, N. J.

Machinery Markets and News of the Works

WESTERN RAILROADS BUYING

Some Activity at Chicago But Other Tool Markets are Dull

Several Carriers in the Market for Shop Equipment in Central West, but Eastern Roads Have Not Started to Buy

With the exception of Chicago, where there is a fair volume of railroad inquiry and buying, the dullness of the machine tool markets is very pronounced. Reports from Cleveland, Cincinnati, Detroit and New York indicate a minimum of orders, and inquiries are also few. Some machine-tool manufacturing plants have slowed down operations, a few have released a part of their

working forces and stocks of tools are piling up, many lines now being available for prompt shipment.

Among the roads which are or have been active in the Chicago market are the Chicago & Northwestern, Santa Fe, Union Pacific, Pere Marquette and Illinois Central. Pending inquiries from some of these roads total several hundred thousand dollars.

In the East expected railroad business has not materialized, chiefly because of the inability of purchasing departments to procure appropriations. An inquiry from Canada calls for upward of 40 tools, both metal-working and wood-working, for the Grand Trunk Railway System.

Industrial companies are not buying in volume, but the requirements of the General Electric Co. are being figured on in Eastern selling centers. New inquiries from this company call for tools for its Bloomfield, N. J., works. The American Brake Shoe & Foundry Co., New York, has an inquiry out for about a dozen machines.

New York

NEW YORK, Sept. 14.

The Grand Trunk Railway System, through its purchasing agent, George W. Caye, Montreal, Que., has issued inquiries for the following metal working and woodworking machinery for its various shops in Canada:

Metal-working Tools:

Two driving wheel lathes, 90 in. swing.
Two gap lathes, 27 x 50 in., Bertram or equivalent.
One 60 in. duplex horizontal driving box boring machine.
One universal horizontal boring machine equivalent to No. 32 Lucas.
Two single frame steam hammers, 800 lb., Bertram or equivalent.
One engine lathe, 26 in. x 12 ft.
One crank shaper, 20 x 22 in.
One Fox turret lathe, 12 in. x 8 ft.
One radius link grinding machine.
One Gisholt horizontal axle box boring machine, 36 in. table.
One McCabe pneumatic flanging machine.
One 35-ton hydraulic spring testing machine.
Six Bridgeport grinders, No. 7 or equivalent.
One 42-in. car wheel lathe, Bertram or Niles.
One triple head bolt cutter, capacity $\frac{1}{2}$ in. to 2 in., equivalent to Acme.
Four 26 in. sliding head drill presses, Sibley or equivalent.

Wood-working Tools:

One double arbor universal saw bench, similar to Greenlee No. 478.
One 36-in. band saw.
One 16 in. hand jointer.
Five swing cut-off saws, equivalent to Yates No. 232.
One combined radial car boring machine, equivalent to Greenlee No. 336.
Four self-feeding rip saws, equivalent to Yates No. 255.
Four vertical hollow chisel car mortisers and borers, equivalent to Fay & Egan No. 365.

Other railroad buying in the East has been inconsequential. The Nashville, Chattanooga & St. Louis has bought about \$15,000 worth of new shop equipment. The New York Central and Baltimore & Ohio, from which lists have been expected, have received no appropriations at this writing and their buying will be postponed until funds are forthcoming.

A small list has been sent out by the American Brake Shoe & Foundry Co., New York, calling for the following machines:

One 42 in. shear.
Two 42 in. punches.
One 1100 or 1200 lb. steam hammer.

One 42 in. wheel boring machine.

Two 36 in. drill presses.

One 20 in. x 12 ft. engine lathe.

One 6 x 6 in. power hack saw.

One bolt riveter, $\frac{1}{4} \times 4\frac{1}{2}$ in.

Orders for machine tools in the past week have been few and far between. August business on the whole was the poorest of the year. One Eastern machine tool company's total sales for the month were less than 10 per cent of its capacity and cancellations were about equal to new orders. While this may be an extreme case, the fact remains that the machine-tool industry has struck the worst slump since before the war. Machine tool builders are catching up on deliveries and many machines which a few months ago could not be obtained short of eight or ten weeks delivery are now to be had from stock. Some of the Eastern machine tool plants have slowed down operations to keep pace with the greatly reduced volume of business.

Export business has also fallen off. England, which was a good buyer in the early part of the year, is taking practically nothing now. The principal buying for export in the past few weeks has been done for the North East Railroad of Brazil. It is reported that purchases of electrical and power equipment and machine tools are close to \$1,000,000, of which about \$200,000 is for machine tools. Mr. Malta, of the firm of Costa, Campos & Malta, Sao Paulo, Brazil, who is at the Hotel Hargrave, New York, is placing the orders.

The Batavia Steel Car Co., Batavia, N. Y., which is contemplating the erection of a car works, is expected to come into the market soon for steel fabricating machinery.

Although inquiries are fairly numerous and several fair sized orders are pending, the crane market shows little change from the dullness of the past few weeks. The H. S. B. W.-Cochrane Corporation, Seventeenth Street and Allegheny Avenue, Philadelphia, has purchased a 5-ton overhead traveling crane and is in the market for a 10-ton to 15-ton, 40-ft. span overhead traveling crane, either new or second-hand. The contract for an addition to the power plant of the Victor Talking Machine Co., at Camden, N. J., costing about \$300,000 has been awarded to the White Construction Co., 95 Madison Avenue, New York. The building will be about 40 x 200 ft. Robert Grant, 233 Broadway, New York, has withdrawn his inquiry for a 5-ton crane for the Slatington Iron Works, Slatington, Pa.

Among recent sales reported are: The Milwaukee Electric Crane & Mfg. Co., two 10-ton, 50-ft. span overhead traveling cranes to the Truscon Steel Co., Pittsburgh for a Chicago warehouse; Chesapeake Iron Works, two 15-ton overhead traveling cranes to the Middletown Car Co., Middletown, Pa.; Shepard Electric Crane & Hoist Co., a 5-ton grab bucket crane to the American Agricultural & Chemical Co., Boston; a 5-ton, 35-ft. span overhead traveling crane to the Pittsburgh Screw & Bolt Co., Pittsburgh; a 5-ton, 32-ft. span overhead traveling crane to the Hempfield Foundries Co.,

Huff, Pa., and two 15-ton, 40-ft. 9-in. and 18-ft. 11-in. span overhead traveling cranes to the Aluminum Co. of America, Niagara Falls, N. Y.; Cleveland Crane & Engineering Co., two 5-ton, 55-ft. and 70-ft. span cranes to the Sprague Electric Works, New Kensington, Pa., and a 5-ton handpower crane to the Thomas A. Edison Co., Inc., East Orange, N. J.

The Lucky 13 Phonograph Co., 46 East Twelfth Street, New York, manufacturer of talking machines and parts, has acquired property at 310-14 Avenue A and 503 East Nineteenth Street, for the establishment of new works.

The Bishop Calculating Recorder Co., 233 Broadway, New York, manufacturer of recording instruments, etc., has changed its name to the Bristol Industries, Inc.

The Glassmann-Bartha Welding Corporation, 132 Tenth Avenue, New York, manufacturer of welding equipment, has increased its capital to \$100,000.

The Service Operating Co. of New York, New York, has been incorporated with an active capital of \$550,000 by H. P. Wanner, R. J. Urevich and J. E. Worthington, Jr., 120 Broadway, to manufacture vending machines for postage stamps and other commodities.

The Bronx Builders' Machine Co., 680 East 133rd Street, New York, manufacturer of automobile parts and other machine equipment, has acquired a one and two-story building, 100 x 100 ft., in the vicinity of its present works for extensions.

The Buckingham Steel Co., 5610 Second Avenue, Brooklyn, has increased its capital from \$10,000 to \$50,000.

The Builtwell Auto Body Co., 59 Jackson Street, Brooklyn, has awarded a contract to Miller Brothers, 668 Saratoga Avenue, for a new one-story plant at Morgan Avenue and Lombardi Street, 100 x 100 ft., to cost about \$25,000. B. Stillwell is president.

The American-La France Co., Elmira, N. Y., manufacturer of motor-driven fire equipment, has increased its capital from \$4,950,000 to \$5,950,000. It is operating at capacity and is said to have orders on hand to continue maximum production for the next five months. Contract was recently let to the Foundation Co., New York, for a new plant at Bloomfield, N. J., to manufacture motor trucks, and construction has begun.

The Central Metal Products Corporation, New York, has been formed by a consolidation of the Empire Art Metal Co., College Point, L. I., and the Zahner Metal Sash & Door Co., Canton, Ohio. The new company will operate both plants, continuing in the same line of production.

The Rome Metal Products Co., 23 West Forty-third Street, New York, has increased its capital to \$101,000.

The John J. Riley Co., Van Brunt Street, Brooklyn, manufacturer of iron and brass castings, has taken bids and will soon award contract for its new one-story foundry on Columbia Street, 100 x 250 ft., estimated to cost in excess of \$150,000, including equipment.

The Ludlum Steel Co., 2 Rector Street, New York, will use the one-story building, 90 x 120 ft., now in course of erection at its plant, Albany, N. Y., as a wire mill. It will be brick and steel, and is estimated to cost about \$40,000.

The Cities Service Co., 60 Wall Street, New York, operated by Henry L. Doherty & Co., is planning for extensions and improvements in its oil refinery at Ponca City, Okla., to cost about \$1,000,000. The plant at Independence, Kan., will be dismantled, and the equipment removed to the Ponca City works, which will be reconstructed, with the erection of additions to accommodate additional machinery.

The Anchor Cap & Closure Corporation, 81 Prospect Street, Brooklyn, manufacturer of metal bottle seal caps, etc., has increased its capital from \$1,000,000 to \$2,500,000. It operates a branch plant at Astoria, L. I.

The Community Garage, Inc., New York, lately organized, has leased two one-story buildings, 100 x 185 ft. and 100 x 175 ft., recently completed on Whitlock Avenue, between 156th Street and Longwood Avenue, which will be equipped as an automobile service and repair works.

Cranes, hoisting, conveying and other machinery will be installed at the new piers and warehouses to be constructed by the American Chain of Warehouses, Cleveland, A. H. Greeley, president, on Mill Basin, Jamaica Bay, Brooklyn. A proposition has been tendered by the company to the New York Dock Department covering a leasehold of the site for 50 years, with increasing rental for ten-year periods until a maximum of \$1,250,000 is reached. It is proposed to build six piers and four supporting warehouses, with total cost estimated in excess of \$25,000,000. The company is now operating warehouse terminals in more than 100 cities of the United States.

The Nolen Standard Muffler Co., 1919 Broadway, New

York, manufacturer of metal automobile mufflers and kindred products, has increased its capital from \$350,000 to \$450,000.

The Wonder Valve Grinder Co., New York, has been incorporated with a capital of \$50,000 by J. Owens, A. Sadow and K. G. J. Schades, 511 West 157th Street, to manufacture valve grinding machinery and other specialties.

The Charles Ross & Son Co., 148 Classon Avenue, Brooklyn, manufacturer of machinery and parts, has increased its capital from \$200,000 to \$500,000.

The Standard White Metal Co., New York, has been incorporated with a capital of \$85,000 by M. Kahn, S. Feldman and D. Wolff, 547 West Twenty-first Street, to manufacture metal goods.

The Victor Metal Products Corporation, 29 Broadway, New York, has increased its capital from \$100,000 to \$200,000.

The New York Air Brake Co., 165 Broadway, New York, has placed two of its munition plants at Watertown, N. Y., on the market. The works were built during the war and comprise several one-story buildings, aggregating about 503,000 sq. ft. of space.

Schwartz, Seymour & Co., Inc., New York, has been incorporated with an active capital of \$150,000 by A. A. Schwartz, R. C. Seymour and E. Lillenthal, 276 Riverside Drive, to manufacture machinery and parts, metal equipment, etc.

The Standard Textile Products Co., Broadway, Athenia, N. J., has awarded a contract to J. Dunn, 129 Market Street, Paterson, N. J., for a one-story addition to its machine shop to cost about \$30,000.

William J. Garmany, First Street, South Orange, N. J., has filed plans for a one-story machine shop and automobile repair works on Valley Road to cost about \$25,000.

The Radio Corporation of America, Woolworth Building, New York, has acquired the wireless station at Tuckerton, N. J., formerly operated by the Marconi Co., and has plans under way for extensions to cost about \$200,000, including equipment. The J. G. White Engineering Corporation, 43 Exchange Place, will be in charge.

A power plant, 50 x 100 ft., to cost about \$500,000 with equipment, will be erected by the Illinois Glass Co., Alton, Ill., at its proposed new plant at Bridgeton, N. J. Plans have been prepared. A producer building, comprising two units, 50 x 150 ft., will also be constructed to cost \$500,000, with machinery. The lehr building will be 330 x 700 ft., and with machinery will cost in excess of \$1,000,000. The construction will be in charge of the Keeley Brothers Construction Co., St. Louis.

The Lehigh Valley Railroad Co., Jersey City, N. J., is planning for the establishment of a new terminal at South Plainfield, N. J., including the establishment of shops, yards, storage buildings and other structures, with cranes and other freight handling machinery. It is proposed to remove the present shops at Perth Amboy, N. J., to the new location, for locomotive and car repair work. Other plans include the handling of coal shipments at Jersey City as a primary point of loading and unloading, transferring considerable work of this nature now at Perth Amboy, with the installation of necessary facilities at the Jersey City docks to carry out the work.

The Driver-Harris Co., Middlesex Street, Harrison, N. J., manufacturer of wire products, is having plans prepared for two two-story additions, to cost about \$80,000 and \$40,000, respectively. Lockwood, Green & Co., 101 Park Avenue, New York, are engineers.

The Sun Machinery Co., 278 Washington Street, Newark, N. J., has leased about 20,000 sq. ft. of space at 107 Commerce Street, for a new establishment.

The Industrial Mfg. Corporation of America, 222 Market Street, Newark, has been incorporated with a capital of \$600,000 by Andrew J. Hand, George F. Long and Gustave W. Maxflat, to manufacture file-cutting and other machinery.

The National Lock Washer Co., 65 Johnson Street, Newark, manufacturer of lock washers, metal car curtain fixtures, etc., is having plans prepared for the erection of an addition.

The C. & V. Mfg. Co., 54 Winans Avenue, Newark, has filed notice of organization to manufacture tools and dies. Emil Cluesmann, 586 South Fourteenth Street, heads the company.

The Aluminum Ware Mfg. Co., Inc., 784 Broad Street, Newark, has filed notice of dissolution under New Jersey laws.

The Industrial Engineering Co., 437 Summit Avenue, Jersey City, manufacturer of machinery, has changed its name to the Industrial Dryers Corporation.

Plans have been filed by the Bethlehem Shipbuilding Corporation, Front Street, Elizabeth, N. J., for a new one-story machine shop to cost about \$25,000.

New England

BOSTON, Sept. 13.

The local machine-tool market the past week was practically flat, no sales of importance being noted. The General Electric Co., West Lynn, Mass., will soon purchase against its recently issued list, and the Saco-Lowell Works, Boston, textile machinery, and several other leading companies intimate they also will enter the market in a few weeks. So far as can be learned no cancellations have been received. Prices are firm and sentiment is decidedly more cheerful. The lack of new accounts the past fortnight has allowed tool manufacturers to make considerable impression on business booked and many can now name quicker deliveries than heretofore.

The quietness in the demand for new tools is reflected in that for used machines. The International Engineering Co., Malden, Mass., has purchased several used lathes, small tools and fixtures; the Bay State Tap & Die Co., Mansfield, Mass., Reed stud lathes; the Blancke Twist Drill Co., Taunton, Pratt & Whitney mills; the Winnisimmet Shipyard, Inc., Chelsea, a set of hand bending rolls, and the Boston Construction Co., Boston, a sensitive drill. The International Woodworking Co., Dover, N. H., is in the market for two second-hand five-ton hand power traveling cranes. The city of Boston has bought from the Coburn Trolley Track Co., for the fire department, an overhead track with chain hoist, for \$2,375.

The Boston District Ordnance Salvage Board will sell at auction Sept. 22, 23 and 24, at the Scituate Proving Grounds, Scituate, Mass., a large amount of Government property, including 800 machine tools and pieces of machinery, mechanical instruments and equipment, grinding wheels, hundreds of high-speed small tools and self-opening die heads and vises. Most of the machine-tools will be sold the first day. Many are new and some are in original shipping crates. It is believed that this sale will practically eliminate the Government from the New England machine tool field.

Contract has been let for a boiler house at the plant of the Springfield Foundry Co., Springfield, Mass.

The American Wringer Co., Woonsocket, R. I., plans to erect a 66 x 180 ft. addition within the next few months.

The one-story, 56 x 108 ft., addition to the plant of the Davitt Foundry Co., Liberty Street, Springfield, Mass., is nearing completion. Several other changes in layout are being made.

The Waldon Tool & Metal Mfg. Co., Norwich, Conn., with a capital of \$50,000, has taken out a Connecticut charter to manufacture tools, machinery, etc. The incorporators are A. A. Walroden, C. E. Klet, and Alfred Freeberg, Norwich, and Martin Karlin, Roslindale, Mass.

The United Illuminating Co., Bridgeport, Conn., has awarded a contract for several new buildings to be erected on the site of the old Farist Steel Co.'s plant. When completed it will have an ultimate capacity of 100,000 kw. and will cost approximately \$3,000,000 with equipment.

Landers, Frary & Clark, New Britain, Conn., cutlery, etc., are to add three additional stories to one of its three-story, 60 x 210 ft. plants.

The Bethlehem Shipbuilding Corporation, Bethlehem, Pa., has awarded contract for a control house for the new drydock at its Fore River Works, Quincy, Mass.

Work has been started on the two one-story additions, 30 x 100 ft. and 30 x 90 ft., respectively, to be made at the plant of the Hartford Tube Products Co., West Hartford, Conn.

The Robert Gair Co., Brooklyn, N. Y., paper goods, has awarded contract for a one and two-story plant, 32 x 302 ft., in the Montville section of New London, Conn.

The first unit of the plant of the Greyhound Motor Corporation, New York City, at East Warren, R. I., is nearing completion. Work on a second unit, one-story 100 x 200 ft., and a power plant will start immediately.

Engineers have been surveying the property of the New England Enameling Co., Middletown, Conn. It is the intention to increase the power plant and to install a transmission system.

Plans are being drawn for two-story, 226 x 245 ft. high school for Stratford, Conn., which will contain sheet metal, machine and woodworking shops. Estimates will not be asked for until after the town meeting on Oct. 12.

The Connecticut Broach & Machine Co., New London, Conn., will soon start operations at 376 Bank Street. It will at first confine its endeavors to a general line of broaches, keyway cutters and the like, but next year contemplates bringing out a new broaching machine. R. J.

Cary is president, C. S. Amadon secretary and treasurer, and W. R. Cary chief designer, all of whom were formerly connected with the J. N. Lapointe Co., New London.

A power plant, 50 x 70 ft., will be erected by the Holliston Mills, Lenox Avenue, Norwood, Mass., in connection with the construction of an addition to its textile mill.

The Cornwall & Patterson Co., State and Fairfield avenues, Bridgeport, Conn., manufacturer of hardware products and metal goods, has awarded contract to the S. W. Hubbell Building Co., 589 Knowlton Street, for a one-story addition, 85 x 100 ft., to cost about \$60,000.

The Smith Paper Co., Lee, Mass., has filed plans for a one-story addition to its machine department at the Columbia mill, 66 x 162 ft.

The Liberty Paper Co., Inc., Bellows Falls, Vt., has completed plans for a three-story addition to cost about \$130,000, including machinery and electrical operating equipment.

The Wade & Dunton Co., Lewiston, Me., has filed plans for a three-story automobile service and repair building on Park Street, 100 x 120 ft., to cost about \$150,000.

The G. E. Prentice Mfg. Co., New Britain, Conn., manufacturer of metal buckles, etc., is considering the erection of a new plant in the Kensington district. It is understood that work will be deferred until early in 1921. Details are now being arranged. George E. Prentice is president.

Philadelphia

PHILADELPHIA, Sept. 13.

The National Stabestos Co., Germantown Avenue and Armot Street, manufacturer of automobile brake lining specialties, etc., has awarded contract to R. M. Peterson, 5114 Germantown Avenue, for a new two-story plant, 50 x 70 ft., at Germantown Avenue and Berkley Street, to cost about \$60,000.

The Penn-Seaboard Steel Co., Franklin Bank Building, Philadelphia, is arranging for an increase in its capital from \$1,250,000 to \$1,750,000.

The Fox Motor Co., Broad and Huntingdon streets, Philadelphia, operating a general machine works for the manufacture of motor parts, etc., has plans under way for a new four-story brick and concrete plant at Seventh and Grange streets, to cost about \$500,000, including equipment.

The Neel Cadillac Co., Philadelphia, has leased the six-story building at Twenty-fourth and Locust streets, comprising about 120,000 sq. ft. of space, for a new automobile service and repair works.

Bids will soon be asked for a power house, 25 x 60 ft., at the plant of the Dearney Brothers Worsted Spinning Co., Main Street, near Walnut Lane. F. V. Nickels, 4400 Manayunk Avenue, is architect.

The Philadelphia Electric Co., 1000 Chestnut Street, Philadelphia, has completed plans for a new power plant at Beach and Palmer streets, to cost about \$60,000.

A one-story power plant to cost about \$75,000 will be erected by John R. Evans & Co., 419 Arch Street, Philadelphia, at their leather plant at Second and Erie streets, Camden, N. J.

The Edison Lamp Works of the General Electric Co., 120 Broadway, New York, is having plans prepared for an addition to the plant of the Scranton Textile Co., Scranton, Pa., recently acquired, to be equipped for general lamp manufacture. It will be three stories and is estimated to cost about \$200,000. Bids will be asked at an early date.

The Hurlburt Motor Truck Co., Harrisburg, Pa., manufacturer of automobile trucks, has increased its capital to \$280,000.

Fire, Sept. 1, destroyed a section of the plant of the Ellwood Ivins Tube Works, Oaklane Terrace, Philadelphia, manufacturer of metal tubing, with loss estimated at about \$250,000. It is understood that plans are under way for rebuilding.

George F. Sproule, director, Department of Wharves, Docks and Ferries, Philadelphia, has sent a communication to Mayor Moore, covering the proposed program for pier and dock construction, estimated to cost \$20,000,000, including cranes, hoisting, conveying and other necessary machinery. Immediate construction, estimated at \$11,000,000, is to include new piers, 110-112 South Wharves, each 300 ft. wide by 1200 ft. long, to cost \$4,000,000 each, with machinery installation. Other work will include the construction of similar structures at the Moyamensing Pier Group.

Plans have been completed for a power house, 40 x 70 ft., to cost about \$25,000 at the factory of the Ferguson Carpet Co., Rockland and Stenton streets, Philadelphia.

The Trenton Patent Mfg. Co., Trenton, N. J., recently

organized, has acquired a building on Somerset Street, Hopewell, N. J., formerly occupied by the Smith Mfg. Co., which it will equip for the manufacture of pistons for motor car service, garden appliances and other metal products. William J. Jaeger is president, and William E. Leedom, secretary. The Smith company, manufacturer of registers, parts, etc., will continue operations in a new building, recently erected.

Plans for a new three-story power plant, 138 x 200 ft., to cost about \$350,000, for erection at the State Normal School, Glassboro, N. J., have been completed by the State Board of Education, Capitol Building, Trenton, N. J., C. H. Kendall is secretary. Francis H. Bent, 1420 State Street, Trenton, is State architect.

Charles W. Brick, Crosswicks, N. J., has had plans prepared for a new power plant, to be used for electric service in this district. Application has been made to the Board of Public Utility Commissioners for permission to construct lines, etc., to be used in connection with the plant.

The Lehigh Structural Steel Co., Allentown, Pa., has had preliminary plans prepared for an addition to its building at the foot of Allen Street.

The Gray Iron Foundry Co., Reading, Pa., manufacturer of iron and steel castings, has filed plans for a one-story addition to cost about \$40,000.

The Lehigh Valley Railroad Co., Hazleton, Pa., is arranging for the removal of its car repair works from Hazle Creek to Hazleton, where the department will be consolidated with the present shops. It is proposed to make the Hazleton shops the center for car repair and inspection work for the Hazleton and Mahonoy divisions.

The Standard Top Co., Walnut Street and Wyoming Avenue, Scranton, Pa., manufacturer of automobile tops, has completed plans for a new one-story plant, 40 x 100 ft., to cost about \$10,000, exclusive of equipment. G. N. Edson, Connell Building, Scranton, is architect.

The Weiss-Bitting Co., 816 Linden Street, Allentown, Pa., machinery, parts, etc., has leased a three-story building at 1022 Hamilton Street. Removal will be made at an early date.

The Excelsior Galvanizing Co., Reading Pa., has been incorporated with a capital of \$25,000 by William F. McCullough, George S. Baranowski and R. J. Wertheim, to manufacture galvanized metal products.

The Weatherly Foundry & Mfg. Co., Weatherly, Pa., recently incorporated in Delaware with capital of \$500,000, has taken over the local plant of the Weatherly Foundry & Machine Co. The purchasing company is composed of new interests, who will operate the plant for the manufacture of machinery and parts, iron and steel castings, etc. In the future the company will be closely allied to the Wilmot Engineering Co., Hazleton, Pa., manufacturer of similar products. George W. Wilmot, president and general manager of the Wilmot company, will be president of the new organization; T. E. Learned is vice-president, and Joseph C. Hoffman, also of the Wilmot company, will be treasurer.

The Adder Machine Co., Kingston, near Wilkes-Barre, Pa., manufacturer of visible adding machines, is taking bids for a two-story addition at Walnut and Hoyt streets, to cost about \$40,000.

The International Boiler Works, Stroudsburg, Pa., manufacturer of boilers, tanks, etc., has increased its capital from \$300,000 to \$500,000.

The Lycoming Foundry & Machine Co., Williamsport, Pa., manufacturer of gas and gasoline engines, automobile parts, etc., has awarded a contract to J. V. Bennett & Co., Williamsport, for a one-story addition, 240 x 560 ft., and construction has begun. The new building is estimated to cost in excess of \$300,000, including equipment.

The Pennsylvania Railroad Co., Broad Street Station, Philadelphia, is planning for extensive additions to its shops and freight yards at Conway, Pa., estimated to cost in excess of \$700,000. Plans have been completed for enlargements to the car repair shops at Middletown, Pa. This plant is being used for new car construction and repair work and the capacity will be increased. Plans are also under way for an addition to the repair shops at Altoona, Pa.

The United States Compression Inner Tube Co., Wabash Building, Pittsburgh, has completed plans and will soon commence erection of its plant at Kittanning, Pa., for the manufacture of puncture-proof tubes for automobile tires. The main building will be two stories, 280 x 700 ft., and the plant, including machinery, is estimated to cost in excess of \$500,000.

The Allen Tire & Rubber Co., 510 Hamilton Street, Allentown, Pa., is planning for the installation of machinery at its new works on Bachman Terrace. The first unit is nearing completion, and construction has begun on a power plant.

Chicago

CHICAGO, Sept. 13.

Railroad business continues the most important feature in the machine tool market. The new inquiry by the Chicago & Northwestern, calling for about 50 tools, and the additions to the pending Santa Fe lists, were noted in another column in THE IRON AGE of Sept. 9. The Rock Island has sent out an inquiry for a pipe bending machine. Whereas railroad inquiries have been prominent for several weeks past, buying against standing lists has now commenced and promises to add materially to the bookings of sellers. A week ago the Union Pacific bought about \$60,000 worth of equipment for its various shops. The Santa Fe has purchased approximately \$100,000 worth of tools against its lists and is expected to buy \$150,000 worth additional. The Chicago & Northwestern is expected to close on its smaller list issued some time ago, and the Pere Marquette and Illinois Central will also take action on their inquiries soon. One of the inquiries from the Pere Marquette was sent to dealers through the Arnold Co., Chicago, and covers requirements, amounting to \$50,000, for its new Grand Rapids, Mich., shop and roundhouse. Even more equipment will be bought for its Saginaw, Mich., shops, and a number of tools will also be purchased for its new Plymouth, Mich., roundhouse and shop.

Railroad equipment companies have not yet taken much interest in the market. Outside of the railroads, inquiries and orders are few, although more numerous the past week than for a month or two. The Western Electric Co. has bought 24 geared head-direct-connected motor-driven engine lathes of the following sizes: 12 in. x 5 ft., 14 in. x 6 ft., 16 in. x 6 ft. and 18 in. x 8 ft. Printing press manufacturers are exceptionally busy, a typical plant being booked ahead for two years. Mimeograph and addressograph manufacturers, in fact, all industries affiliated with the publishing business or with the turning out of circular matter, are doing well. The Addressograph Co. has placed orders for a 14-in. x 6-ft. engine lathe and a No. 2 universal milling machine. The Wahl Co., manufacturer of adding machines and pencils, has bought two 14-in. x 6-ft. engine lathes. The Illinois Malleable Iron Co. has closed for a 20-in. x 10-ft. engine lathe.

The Board of Education has been active the past month, having ordered 30 9-in. x 5-ft. engine lathes for the Nicholas Senn High School and now being in the market for two 13-in. x 5-ft. engine lathes for the Lane High School.

The Chicago District Ordnance Salvage Board held an auction at its local depot Sept. 9 and 10, and sold a large number of machines at low prices. Some standard tools, hardly used, went at 10 per cent of cost. In general, the prices paid, while low, were somewhat higher than prices paid at a recent sale at Toledo.

The Robey Foundry Co., not incorporated, has practically completed a foundry at 5815-19 South Robey Street, Chicago.

Holton, Seelye & Co., 140 South Dearborn Street, Chicago, have contracted to erect a one-story steel service station, 113 x 418 ft., containing 47,000 sq. ft., at 514-554 Thirty-fourth Place, for the Magnetic Motors Co., distributor of Peerless, Stevens Duryea and Rauch & Lang cars. Work was begun Sept. 7, and is to be finished by Nov. 1. The building will cost \$150,000.

The Wyman Gordon Co., Worcester, Mass., has taken over the plant of the Ingalls Shepard Forging Co., Harvey, Ill., which will hereafter be known as the Ingalls Shepard Division of the Wyman Gordon Co. The Harvey property is at 147th Street and Page Avenue and consists of seven acres improved with shops and 15 acres adjoining.

The Northwestern Expanded Metal Co., 37 West Van Buren Street, Chicago, has let contract for a one-story factory, 93 x 125 ft., at 1719-27 North Kostner Avenue, to cost \$50,000.

Davidson & Weiss, architects, 53 West Jackson Boulevard, Chicago, have received bids on a one and two-story foundry and office building, 100 x 200 ft., at Thirty-fifth Street, Thirty-fifth Place, Leavitt Street and the Chicago & Alton tracks, for the Charles H. Miles Foundry Co., 2433 West Twenty-first Street, at a cost of \$150,000.

The Chicago Bearing Metal Co., 2234 West Forty-third Street, Chicago, has let contracts for a one-story factory, 47 x 93 ft., West Forty-third Street and the Pennsylvania tracks, to cost \$12,000.

The General Stamping & Mfg. Works, 2225 West Chicago Avenue, Chicago, will build a one-story machine shop, 45 x 72 ft., at 2223-29 West Chicago Avenue, to cost \$10,000.

The Regle Brass Co., Grand Rapids, Mich., manufacturer of plumbers' brass goods, has completed its plant and has been operating its foundry, core, tool and grinding departments for about a week. Work will start in the machine shop soon.

The Industrial Foundry Co., St. Johns, Mich., will rebuild

its foundry, recently destroyed by tornado and fire. Reconstruction work will cost \$30,000.

The Eaton Metal Products Co., Denver, Colo., has purchased five acres near the Union Stockyards and will erect a new factory. It will be built in units, depending upon the demand for oil storage tanks, steel oil barrels and other welded products. It is believed that the outlay for the first year will be \$175,000.

The Bridgeport Machine Co., Wichita, Kan., has been incorporated in Delaware with capital of \$2,400,000 by J. A. Woods, E. W. Boyd and George M. Smith, all of Wichita, to manufacture machinery and parts.

The Borgerding Lumber Co., Freeport, Minn., has preliminary plans under way for a one-story machine shop, 25 x 60 ft., estimated to cost about \$25,000.

The Gottberg Automobile Co., Columbus, Neb., has two-story service and repair works, 93 x 132 ft., to cost awarded a contract to Zuerlin & Woerth, Columbus, for a about \$100,000.

A new rotary room and machine department to cost about \$100,000 will be constructed by the Crescent Paper Co., Marseilles, Ill. Plans have been prepared.

Baltimore

BALTIMORE, Sept. 13.

The Kennedy Corporation, Baltimore, recently incorporated with \$2,000,000 capital stock, and of which Joseph P. Kennedy is head, has bought the plant of Fairbanks, Morse & Co. and also the entire capital stock of the Baltimore Malleable Iron & Steel Casting Co., the price for both being \$1,850,000. The Kennedy Corporation was formed to specialize in automobile agricultural tractors and railroad castings and the two additional plants adjoin its property. It was recently stated that the Baltimore Malleable Iron & Steel Casting Co. planned extensions and the installation of equipment which would double its capacity.

The Globe Shipbuilding & Dry Dock Co., Fairfield, Baltimore, is rushing work on shops and other buildings and in the near future will employ about 1200 men. Work has already been taken up at the yards, including the repair of a number of vessels. Benjamin C. Cooke is president.

The Marine Transportation Co., 908-10 South Broadway, Baltimore, has been incorporated with \$450,000 capital stock to build and repair vessels. The incorporators are Clarence B. and Arthur E. Gore and George H. Kastendike.

The Home Lighting Co., 616 East Baltimore Street, Baltimore, has been incorporated with a capital stock of \$20,400 to manufacture lighting fixtures, etc. The incorporators are Joseph Vigman, Israel Hoffman and Maurice Blumberg.

The Marine Iron Works, Norfolk, Va., will build a two-story machine shop to be 60 x 175 ft. R. O. Coleman is president.

H. L. Lawton, Lena, S. C., desires quotations on second-hand lathes, planers, shapers, etc.

F. Phillips & Sons, 1336 Greenmount Avenue, Baltimore, manufacturers of tools, have awarded a contract to C. C. Watts, 407 East Twenty-fifth Street, for a two-story and basement addition, 38 x 70 ft., to cost about \$30,000.

The Steinmetz Electric Motor Car Corporation, Baltimore, which recently acquired property on Kate Avenue, fronting on the Western Maryland Railroad, Arlington, for the manufacture of electrically operated motor trucks, is enlarging its plant to include the manufacture of gas operated tractors.

The Spann Motor Co., 3125 Philadelphia Avenue, Baltimore, has completed plans for a new two-story machine shop, service building and automobile repair works at Elwood and Philadelphia avenues, 150 x 167 ft., to cost about \$25,000.

The Baltimore Buggy Top Co., 107 West Mount Royal Avenue, Baltimore, manufacturer of automobile tops and operating a machine works for automobile parts manufacture and repairs, has awarded a contract to John F. Kunkle, 29 South Linwood Avenue, for a two-story plant, 90 x 150 ft., at Guilford Avenue and Chase Street, to cost about \$150,000, including equipment.

A new power plant, 42 x 52 ft., to cost about \$35,000, will be erected by the Board of Directors, Morgan College, Hillen Road and Arlington Avenue, Baltimore.

The National Oil Co., Inc., Keyser Building, Baltimore, has plans under way for a refinery on Eighth Street, Canton, Md., where it recently acquired property.

The Southern States Phonograph Co., Atlanta, Ga., recently organized with a capital of \$1,250,000 by officials of the Emerson Phonograph Co., 206 Fifth Avenue, New York, has acquired a building, 150 x 310 ft., for the establishment of its local plant. Other structures will be erected on adjoining land to cost about \$375,000, including machinery.

Bowers & Bartlett, Inc., 512 Twelfth Street, N. W., Washington, organized to manufacture a patented electric washing machine, is planning for the early operation of a plant at Hyattsville, Md., to comprise about 26,000 sq. ft. of floor space.

Price Brothers, Inc., Frederick, Md., has been incorporated with a capital of \$100,000 by Osborne I. and Joseph B. Price and Aubrey A. Nichdemus, to manufacture wireless equipment for naval and land service.

The Lynchburg Foundry Co., Lynchburg, Va., has disposed of its Anniston, Ala., plant, operated in the name of the Anniston Cast Iron Pipe Co., to new interests, headed by Thomas F. Kirby, Governor of the State, for \$200,000. The new company has taken possession of the works and will continue operations along present lines.

The Norton Armature Works, Norton, Va., recently organized to manufacture electrical equipment, has leased a building and plans the immediate installation of machinery. D. B. Crawford is president and manager.

The Western Electric Co., Chicago, manufacturer of telephone and other electrical equipment, is considering the establishment of a branch at Baltimore. Negotiations are under way for a building to provide about 30,000 sq. ft. of floor space.

The duPont Motors Co., Commerce and Dock streets, South Wilmington, Del., will commence operations at once in its new plant at Moore, Pa. It will be used for the most part for assembling work, and it is proposed to develop an output of about 150 automobiles per month. The South Wilmington plant will be operated for the present for the manufacture of motors, and body production will be conducted at a plant in Philadelphia.

The Schimeck Gear & Screw Co., Wilmington, Del., has increased its capital from \$200,000 to \$1,000,000.

The Union Shipbuilding Co., Fairfield, Md., will defer the erection of its two-story addition, 70 x 200 ft., until early next year, and bids will be asked at that time.

J. C. Karuse, Washington, D. C., has acquired the plant and business of the Simplex Battery Co., 705 Eighth Street. A complete rebuilding and repair department for electrical battery service will be established.

Buffalo

BUFFALO, Sept. 13.

The Smith & Sons Corporation, 2969 Main Street, Buffalo, manufacturer of wire products and metal goods, is considering plans for a one-story addition, 84 x 84 ft., to cost about \$25,000.

The Poll-Eells Airplane & Motor Corporation, Buffalo, recently organized, has acquired a three-story building at Clinton and Watson streets, and will establish a plant for the manufacture of all-steel airplanes for commercial service. The new works will be given over to parts manufacture and assembling. The company is headed by H. R. Pollay and Fred Eells.

Dunlop America, Inc., Buffalo, manufacturer of automobile tires, has filed notice of change of name to the Dunlop Tire & Rubber Corporation of America. The company is building a plant on the River Road and expects to begin operations with about 7000 operatives. Perry D. Saylor is vice-president and general manager.

The Carborundum Co., Niagara Falls, N. Y., manufacturer of grinding wheels, abrasive materials, etc., has awarded contract to the Turner Construction Co., Sidway Building, Buffalo, for a three-story addition, 50 x 50 ft. It will be used as an extension to building No. 39 and is estimated to cost \$50,000.

The United States Light & Heat Corporation, Niagara Falls, N. Y., manufacturer of electric batteries, railroad lighting and heating equipment, etc., has acquired property adjacent to its plant and is reported to be arranging for the erection of an addition. With the acquisition of a substantial interest in the company by John N. Willys, Willys-Overland Co., Toledo, Ohio, and associates, the local plant will furnish battery requirements and other electrical equipment for the new Chrysler Six automobiles, to be manufactured at the plant of the Willys corporation now in course of erection at Elizabeth, N. J.

The Kast Copper & Sheet Iron Co., 91 Main Street, Buffalo, has filed notice of dissolution under New York laws.

The Harrisville Hardware Co., Harrisville, N. Y., has been incorporated with a capital of \$20,000 by H. J. Corbett, F. H. Kimball and J. L. Humes, to manufacture hardware products and other metal goods.

The Westcott Rule Co., Seneca Falls, N. Y., manufacturer of metal and wood rules, steel measuring tapes, etc., has awarded all miscellaneous contracts for a two-story addition, 75 x 226 ft.

Pittsburgh

PITTSBURGH, Sept. 13.

The crane market in this district is showing a little more activity in awards and inquiries and the belief is gaining ground that some business which has been pending for a long time is not very far from the closing stage. The Electric Alloy Steel Co., Youngstown, recently closed with the Alliance Machine Co., Alliance, Ohio, for one 10-ton, 3-motor, 77-ft. span magnet crane and one 20-ton with 5-ton auxiliary, 4-motor, 56-ft. span ladle crane, to be installed at the company's plant at Charleroi, Pa. The Pressed Steel Car Co., Pittsburgh, recently placed three 7½-ton trolleys with Manning-Maxwell & Moore and the Milwaukee Electric Crane & Mfg. Co. was successful bidder for two 10-ton, 50-ft. span cranes for the new warehouse of the Truscon Steel Co., Youngstown, at Chicago. The Weirton Steel Co., Weirton, W. Va., is in the market for a 5-ton bucket crane and the A. Garrison Foundry Co., Pittsburgh, is looking for one 25-ton, one 50-ton, one 7½-ton and one 5-ton crane. The machine-tool market is not showing much activity except that dealers still report a fair number of sales of machines out of stock. New inquiries are few and far between. Improvement in the railroad transportation situation is finding reflection in better deliveries from manufacturing centers, although complaints are still heard about shipments from New England plants. Prices are firm at about the recent levels.

The Richl Johnston Co., Pittsburgh, machinist and manufacturer of machinery and parts, has leased the three-story building at 17 Third Avenue, 20 x 70 ft., for a general machine works.

The Oil Well Supply Co., Pittsburgh, manufacturer of oil pumping machinery, engines, etc., is perfecting plans for its new plant at La Isleta, on the Tuxpan River, near Tampico, Mexico. It will consist of machine shops, foundry, general iron works and warehouses and is estimated to cost about \$400,000.

A one-story power house to cost about \$50,000 will be erected by the Canaan Coal Co., Canaanville, Ohio, at its local works.

The Westinghouse Electric & Mfg. Co., East Pittsburgh, has acquired 5½ acres in Wilkins Township, vicinity of East Wilkinsburg, Pa., for about \$10,000. It is said that the site will be used for extensions, but no official announcement has been made.

The Sharon Pressed Steel Co., Wheatland, Pa., is arranging for an increase in its capital from \$500,000 to \$2,000,000 at a meeting of stockholders to be held Nov. 1. Tentative plans are under way for enlargements in the plant.

The John Eichleay, Jr., Co., South Twentieth and Wharton streets, Pittsburgh, has been granted permission to build new ship works on the left bank of the Monongahela River, near Glenwood bridge, to include launching ways, shops, etc.

The American Brake Shoe & Foundry Co., Uniontown, Pa., has placed its local foundry on the market, comprising a number of buildings aggregating about 23,400 sq. ft., with industrial railroad, core ovens, etc.

The Oliver Iron & Steel Co., South Tenth and Muriel streets, Pittsburgh, manufacturer of bolts, nuts, rivets, etc., has filed plans for a brick addition to cost, with improvements to be made in an existing factory, about \$50,000.

The Highland Automobile Co., Pittsburgh, has awarded contract to Toupet, Bell & Conley, Pittsburgh, for its new service and repair works on property recently acquired at Liberty and Center avenues. It will be 125 x 300 ft., of brick, steel and concrete, and is estimated to cost about \$600,000, including equipment. Frank D. Saupp is president.

The Pittsburgh Commercial Body Co., Pittsburgh, manufacturer of automobile bodies, has leased property at Amerson Avenue and Pennsylvania Avenue, Shadyside, for extensions.

The Larson Anti-Friction Metal Co., Pittsburgh, has been organized by William K. Frank, 928 South Avenue, Northside, and associates, to manufacture metal products.

A new power house, 40 x 50 ft., to cost about \$80,000 will be erected by the Franklin Quality Refining Co., Franklin, Pa.

The Peerless Foundry Co., 5602 Baum Boulevard, Pittsburgh, manufacturer of iron and steel castings, has awarded a contract to the Memphis Steel Construction Co., Magee Street, for a one-story addition, 50 x 120 ft. C. H. Hook is president.

The Progress Tube Co., Pittsburgh, has been incorporated with a capital of \$50,000 to manufacture metal tubing. S. L. Aronson, 308 North Negley Avenue, is treasurer.

The Welch Armature Co., Welch, W. Va., has filed plans for a new electrical machinery construction and repair plant,

50 x 90 ft., to cost about \$25,000. E. M. Kincaid is secretary-treasurer.

The Winifrede Coal Co., Winifrede, W. Va., is planning for the construction of a new coal tipple to replace the one recently destroyed by fire. Leach Wilson is superintendent.

Cleveland

CLEVELAND, Sept. 13.

The local machine-tool market is almost at a standstill. Dealers report only single tool sales and few of these and manufacturers are getting very little business. Some plants can now make immediate shipment on all sizes and are contemplating further curtailment of operations as much of the machinery now being completed is going into stock. No further cancellations are reported. No inquiries have come from the railroads in this section, although one or two roads are understood to be preparing schedules of their requirements.

Cleveland grey iron foundries engaged in automobile work are running at about 50 per cent capacity and others are still comfortably filled with orders. Orders have improved somewhat with some of the larger steel foundries through the placing of railroad business.

The Fageol Motors Co., Cleveland, will establish a plant for the manufacture of motor trucks and has secured temporary quarters in the building formerly occupied by the National Bronze & Aluminum Foundry Co. F. R. Fageol, president of the new company, is at the head of the Fageol Motors Co., Oakland, Cal., which will continue operations as a separate organization.

The H. K. Ferguson Co., Cleveland, has been given a contract by the Pine Run Coal Co., New Bethlehem, Pa., for a plant to manufacture hollow building tile. It will include a three-story grinding room, 30 x 63 ft.; machine shop, 36 x 90 ft.; clay storage house, 40 x 150 ft.; receiving and discharge buildings for dryers, each 52 x 110 ft.; fan house, 30 x 48 ft., and a waste heat tunnel 50 x 105 ft. The contract amounts to about \$175,000. The Ferguson company has also been given a contract by the American Malleable Co., Owosso, Mich., for extensions aggregating \$150,000, which include additions to the factory, core, hard iron and annealing buildings.

The William Hamilton Sons Car Co., Newark, Ohio, has been incorporated with a capital stock of \$250,000 by William Hamilton, R. E. Hamilton and others. It recently took over the Jewett car plant in Newark and is remodeling it for rebuilding and repairing cars.

The American Piston Co., Bowling Green, Ohio, recently incorporated with a capital stock of \$100,000, has been formed as a holding company to license the manufacture of a new type of piston for automobile motors. H. H. Elwood is president and treasurer; C. C. Freeman, vice-president and general manager and Earl D. Bloom, secretary.

The United States Malleable Iron Co., Toledo, Ohio, has increased its capital stock from \$350,000 to \$850,000 for expansion. Some new equipment will be purchased.

The Elyria Brass & Bronze Co., Elyria, Ohio, has commenced the erection of a new plant on Walnut Street for the manufacture of brass and bronze castings.

Cincinnati

CINCINNATI, Sept. 13.

The machine-tool market continues dull, with orders confined mostly to single machines for prompt shipment. Some manufacturers state that while new business booked is light, more inquiries which are expected to develop into orders have been received the past week than for some time. In some cases companies which actually need tools are holding off placing orders in the expectation that prices will be lower, but it is stated that with the present cost of production no lower prices are in sight. Most of the shops are running full time, the exceptions being those at which strikes were called in May, and which have not yet recruited their forces. There are indications of better labor supply, however, and employers can select the men they wish to take on. In connection with the labor situation in Dayton, it was charged by some labor leaders that there was a concerted effort on the part of employers to discharge men and re-employ them at lower wages. This has been denied by employers, who state that slack business is the only reason for the reduction of forces. It is understood that the machinists in that city will ask to have the working hours reduced to keep the plants in continuous operation.

The Herring-Hall-Marvin Safe Co., Hamilton, Ohio, has awarded contract to the Fisher-Devore Co., Cincinnati, for an addition, 92 x 105 ft., three stories, of concrete, and to cost about \$100,000. According to officials of the company,

sufficient orders are booked to insure continuous operation for the next eight months. The demand for safes from China is very large and the new building is necessary to cope with it.

The plant of the Miller Aeroplane Co., Dayton, Ohio, was destroyed by fire, Sept. 7, caused by the explosion of a gasoline tank. The loss is estimated at \$120,000.

The Williams Co., recently incorporated by Springfield capitalists for the manufacture of steel wool, will build a plant at London, Ohio. The contract has been awarded to Jacob Stoll, and calls for a reinforced concrete building, 50 x 180 ft. The plant is expected to be completed and in operation by Jan. 1.

The machinery has been removed from part of the old plant of the James Leffel Co., Springfield, Ohio, and installed in the new works recently completed. The machine shop is now in operation, and it is expected that the whole plant will be operating soon after Oct. 1. Robbins & Myers will occupy the former building of the Leffel company.

Good progress is being made on the new plant of the Quick-Change Chuck Mfg. Co.'s plant at Arcanum, Ohio, and it is expected to be in operation the first week in December. The Dayton plant of the company is now engaged in making airplane parts for the Government, in addition to its regular line of chucks.

The Apple Electric Mfg. Co., Dayton, Ohio, has been incorporated with a capitalization of \$500,000 to manufacture electric motors and dynamos. Vincent G. Apple, who holds the patents of the motors and dynamos, is one of the incorporators.

The American Piston Co., Bowling Green, Ohio, recently incorporated, was organized to place on the market the Anderson patented slipper type skeleton piston and ring for automobile engines. The company will not manufacture the piston and ring, but will license others to manufacture and sell the product. H. H. Elwood is president.

Indiana

INDIANAPOLIS, Sept. 13.

The George A. Cutter Co., South Bend, Ind., manufacturer of electrical specialties, has filed plans for a one-story addition to its foundry, 64 x 112 ft., and an extension, 65 x 250 ft., for assembling work.

The United States Corrugated Fiber Box Co., Roosevelt Avenue, Indianapolis, is completing plans for a new four-story plant, 100 x 160 ft., to cost about \$125,000, including equipment. C. E. Bacon, Merchants Bank Building, is architect.

The Fort Wayne Electric Works of the General Electric Co., Fort Wayne, Ind., has taken bids for a one-story building at Wall Street and Broadway. Plans have been filed for a one-story forge shop to cost about \$40,000.

The Westinghouse Lamp Co., 165 Broadway, New York, has awarded contract to Dwight P. Robinson & Co., 125 East Forty-sixth Street, for its new five-story plant at Indianapolis, 100 x 400 ft., brick and reinforced-concrete, and adjoining structure.

The Lafayette Tractor & Machinery Co., Lafayette, Ind., has been incorporated with \$100,000 capital stock to manufacture tractors. The directors are Floyd A. Loop, Larry B. Harris and Abner E. Werkhoff.

The Hammon Optical Machine Mfg. Co., Vincennes, Ind., has increased its capital stock from \$70,000 to \$100,000.

Work has been started on an addition to the Ewart plant of the Link Belt Co., at Belmont Avenue and the Big Four Railroad, Indianapolis, to provide additional facilities for the manufacture of chains. It will be one-story, concrete, 70 x 340 ft., and cost about \$100,000. The company had two Indianapolis plants and is reorganizing production at an expense of \$350,000 so that these works will manufacture all the silent chain products it sells west of the Allegheny Mountains.

The National Automatic Tool Co., Richmond, Ind., has increased its capital stock from \$100,000 to \$1,000,000 and has completed an addition to its plant giving 54,000 sq. ft. more floor space. It manufactures multiple spindle drilling machinery. William F. Bockhoff is president; Howard C. Hunt, secretary, and J. H. McCrea, treasurer.

The Fort Wayne Corrugated Paper Co., Hartford City, Ind., has awarded contract to G. W. Heinzmann & Sons, Marion, Ind., for an addition to cost \$200,000.

The Calumet Specialty Co., Whiting, Ind., has been incorporated with \$25,000 capital stock, to manufacture specialties and machinery for plumbing. The directors are William Zimmerman, Harry Lidgard and George Gehrke.

The Superior Stamping & Plating Co., Logansport, Ind., has been incorporated with \$50,000 capital stock, to manufacture novelties. The directors are John C. Cother, Carroll C. Roberts and Edgar F. Metzger.

The Dwiggs Wire Fence Co., Anderson, Ind., has increased its capital stock from \$175,000 to \$200,000.

The Montgomery Mfg. Co., Waveland, Ind., has been incorporated with \$200,000 capital stock, to manufacture non-skid automobile chains. The directors are J. C. Ralston, R. L. Walker and E. E. Gates.

The Safety Iron Co. has been organized at Huntington, Ind., and will be incorporated with \$100,000 capital stock to manufacture a sad iron heated with alcohol. Charles E. Adamson, inventor, and James Renner, Huntington, with Robert Renner, Wabash, Ind., comprise the company.

Detroit

DETROIT, Sept. 13.

Optimism continues among machine-tool dealers in this district with regard to future conditions. It is believed that many orders are being held up pending the presidential election and improvement in financial conditions. Individual orders continue in fair volume.

The St. Johns Industrial Foundry, St. Johns, Mich., will soon build an addition, 50 x 140 ft.

The Belding Foundry Co., of Belding, Mich., is making plans for an extension of its activities.

A two-story addition, 50 x 50 ft., is under construction at the plant of the Regen Stove Co., Wyandotte, Mich.

The American Malleable Co., Owosso, Mich., plans to rebuild immediately the core room recently destroyed by fire with a loss estimated at \$25,000. It will be two stories, 30 x 43 ft., and will cost about \$20,000. Special carrying devices will be required for the new sand sheds, 30 x 350 ft.

It is expected that the addition to the plant of the Fuller & Sons Mfg. Co., Kalamazoo, Mich., will be completed this month. Plans are being made for further expansions during the next three years.

Construction has been started by the DuPont Engineering Co. on a power house at the Jaxon Steel Products plant, Jackson, Mich., to cost about \$20,000.

The Bemet Mfg. Co., contract machinist and tool maker, has moved from 9 West Woodbridge Street, Detroit, to 882-96 East Fort Street.

The National Alloys Co., Detroit, will soon build a foundry, 60 x 100, to cost approximately \$25,000.

The American Machine Products, Detroit, will erect an addition, 65 x 100 ft., one story, estimated to cost \$50,000.

The Cost-Cut Counterbore Co., 74-78 East Fort Street, Detroit, will increase its capacity in the near future by the addition of milling and grinding machines, shapers, lathes and other tools. Extensions to the plant are under way.

The Mutual Electric & Machine Co., Detroit, has discontinued its Wheeling, W. Va., plant and now has its main office and works at Detroit. It will soon build additions which will increase the floor space by 40,000 sq. ft. New equipment will be required.

The Davis Metal Fixture Co., Lansing, Mich., will soon double its manufacturing space and equipment.

The Alma Truck & Auto Parts Co., Alma, Mich., recently organized, will manufacture the Bradley & Austin auto skid truck chains, and expects to begin operations in a short time.

The Great Lakes Foundry Co., Port Huron, Mich., has awarded a contract to W. J. Scott & Co., 315 Quay Street, for a one-story addition, 50 x 100 ft.

The Ann Arbor Stamping & Metal Co., North Main Street, Ann Arbor, Mich., is considering plans for rebuilding the portion of its plant destroyed by fire, Aug. 22, with loss estimated at about \$40,000.

The Monroe Automobile Equipment Co., Monroe, Mich., is having plans prepared for two one-story buildings on East First Street, 90 x 200 ft., and 60 x 70 ft., to be equipped as a foundry and core department, respectively. R. M. Dunbar, Monroe, is architect.

The Litscher & Lite Corporation, Grand Rapids, Mich., manufacturer of storage batteries and other electrical products, has increased its capital from \$1,500,000 to \$5,500,000.

The Detroit Casket Co., 177 Congress Street, Detroit, has completed plans and will call for bids at once for the erection of its new two-story plant, 115 x 165 ft., to cost about \$100,000, including equipment.

A. B. Parfait, Port Huron, Mich., has awarded a contract to A. Schultz, Port Huron, for a two-story automobile service station and repair works, 100 x 300 ft., to cost about \$125,000.

Milwaukee

MILWAUKEE, Sept. 13.

The lessening of demand for machine tools by the automotive industries following the curtailment of production, appears to have given some other divisions of metal-working courage to enter the market with better hope of prompt delivery. While the volume of orders so far in September has not been large, sales aggregate a good total. Makers of milling machines continue to make satisfactory bookings, orders consisting mostly of single machines. The only prospect for large-lot business in the immediate future seems to be from the railroads. So far this has been slow in developing, but inquiry is improving.

The Cedar Grove Stove Co., Cedar Grove, Wis., has been incorporated with an authorized capitalization of \$100,000, as a reorganization of the Wisconsin Foundry & Steel Works, manufacturers of stoves and ranges. The controlling interest was purchased by Peter M. Kettenhofen, formerly superintendent Beaver Dam Malleable Range Co., Beaver Dam, Wis., and associates from Milwaukee, who will continue the shop as a stove and range foundry and do jobbing work in grey and malleable iron and semi-steel casting. Adolph Stodyk, president, and C. W. Holle, secretary, of the old company, retire. Alfred Weyker becomes associated with the new corporation as vice-president and general sales manager. Mr. Kettenhofen is president and general manager; John Van De Wall, secretary, and Thomas Glasscott, sales manager Milwaukee Coke & Gas Co., treasurer. Victor Husting, of the William Frankfurth Hardware Co., Milwaukee, is additional director.

The Nash Motors Co., Kenosha, Wis., has engaged in regular production in its new works on Clement Avenue, Milwaukee, of which B. W. Twyman is general manager. The force numbers 1000, which will be increased to 2000 by Jan. 1 to make possible a first year's production of 10,000 four-cylinder Nash passenger cars. Most of the equipment has been purchased and installed, but additional tools are being contracted for from time to time. G. E. Bechtel is works manager.

The Menominee Motor Truck Co., Clintonville, Wis., has completed its new works and the transfer of its equipment from the former plant at Menominee, Mich., and is operating at the rate of 50 trucks per month, which will be increased to 100 by May 1, 1921. The output to Jan. 1 has been sold. Practically all equipment has been provided. James A. Bell is vice-president and general manager.

The Metal Ware Corporation, Two Rivers, Wis., recently incorporated with a capital stock of \$300,000, will take over the business and works of the Two Rivers Plating & Mfg. Co. A new three-story factory building, containing 25,000 sq. ft., is being equipped with presses and other tools, including a 20-ton press. The principal product will be copper utensils. Quantity production will be undertaken about Oct. 1. William H. Ellis, Charles Kirst and Edward Schwab are the principal stockholders and active managers.

The Schmidt & Storck Wagon Co., West Bend, Wis., manufacturer of heavy-duty wagons, trailers, etc., will build a one-story brick and concrete factory, 100 x 270 ft., costing about \$90,000, with wood and metal-working equipment, including forges, hammers, etc. Bids for the construction are being taken by Buemming & Guth, architects, 521 Jackson Street, Milwaukee.

The A. Z. Metal Works, Thiensville, Wis., established recently to manufacture and repair gas engine radiators, has taken several contracts for furnishing radiators to motor truck manufacturers, the largest being that of the Sterling Motor Truck Co., Milwaukee. Immediate requirements of tools and other machinery have been filled, but further purchases will be made from time to time.

The South Side Garage Co., Sheboygan, Wis., has been incorporated with a capital stock of \$30,000 and will build a two-story brick and steel garage and repair shop at South Twelfth Street and Indiana Avenue, with facilities for manufacturing automotive accessories. The incorporators are John C. Meyer, Fred Roever, Fred Kruger, Albert O. Littmann and Charles Zeinemann.

The Mace Co., Milwaukee, has been incorporated with a capital stock of \$25,000 to manufacture foundry supplies. The incorporators are Cyrus C. Thieme, Robert L. Peters and Charles E. Hammersley, attorney, 714 Majestic Building.

The Two Rivers Oil & Gas Co., Two Rivers, Wis., has been recently organized with \$400,000 capital to purchase lands and operate oil and gas wells in Oklahoma and other States. The incorporators are Frank L. Wolfe, Elton M. Hanson and William Boehringer, all of Two Rivers.

The Modern Steel Casting Co., 1400 Thirty-third Street, Milwaukee, contemplates the erection of an addition to its present shop or the construction of a new plant the coming year. Tentative plans and estimates are being prepared under the direction of Leo G. Smith, president and general manager.

The Gulf States

BIRMINGHAM, Sept. 13.

The Kwikturn Tractor Co., Jacksonville, Fla., recently incorporated with a capital of \$100,000, is planning for the erection of a plant for the manufacture of tractors and parts. P. A. Custer is president.

The Clarksdale Machinery & Supply Mfg. Co., Clarksdale, Miss., is planning for the erection of a new one-story works for the manufacture of electrical equipment. J. H. Hooks is manager.

The Ford Motor Car Co., Detroit, has taken bids for a two-story service and repair works at Jacksonville, Fla., 130 x 147 ft.

The Lumberton Saw Mfg. Co., Lumberton, Miss., recently incorporated with a capital of \$50,000, is arranging for the immediate establishment of a plant. J. W. Williams is head.

The Mobile Copper Works, Mobile, Ala., recently organized, will operate a plant for the manufacture of condensers, retorts, and other copper and sheet iron products.

The Wills Valley Electric Light & Power Co., Hughes Mills, Ala., recently organized, is planning for the erection of a hydroelectric power plant on Wills Creek. C. C. Appleton and E. W. Wade head the company.

The B. & W. Hardware Co., Winter Haven, Fla., has been incorporated with a capital of \$25,000 by L. E. Ball, J. E. Ball, and E. B. Walhall, to manufacture hardware and other metal specialties.

The Bahan Textile Machinery Co., Miami Beach, Fla., has been organized with \$100,000 to manufacture textile machinery. W. H. Bahan, Jr., and E. W. McCue are interested in the project.

The H. W. Dexter Co., Jacksonville, Fla., has been organized to manufacture machinery, and plans are being made for the establishment of a factory. H. W. Dexter is president and C. B. Fulton, manager.

J. E. Garland, Plant City, Fla., is considering the establishment of a factory for the manufacture of tin cans. Quotations on equipment and material are desired.

The Charles Bolt Paper Mills Co., Cincinnati, will equip a \$350,000 mill at New Iberia, La.; also an electric generating plant.

Antonio Guijosa, Villa Acuna, State of Coahuila, Mexico, has obtained a concession from the Mexican Government for the construction of an electric light and power plant at that place. Orders for the machinery and equipment will be placed in the United States.

The Buffalo Oil & Refining Co., Dallas, Tex., will double the capacity of the refinery at Sherman, which it recently purchased.

The Armour Packing Co. of Louisiana, Ltd., T. J. Brennan, manager, 109 North Fourth Street, Monroe, La., will equip a refrigerating plant to cost about \$175,000.

The Lumberton Saw Mfg. Co., Lumberton, Miss., T. C. McLain and others interested, will establish a \$50,000 plant for the manufacture of saws.

The Central South

ST. LOUIS, Sept. 13.

The Bridge & Beach Mfg. Co., 503 South First Street, St. Louis, manufacturer of stoves, ranges, etc., has awarded a contract to the Fruin Colnon Contracting Co., Merchants Laclede Building, for its new plant at Brown and Union avenues, to include a foundry, machine shop, general iron working, assembling and other buildings. The total floor area will provide over 265,000 sq. ft. and with equipment will cost about \$750,000.

The Ford Motor Car Co., Detroit, is taking bids for its new one-story assembling plant, 175 x 535 ft., at Tenth and Winchester streets, Kansas City, Mo., estimated to cost in excess of \$350,000, including equipment.

The Magnus Metal Co., 4153 Clayton Avenue, St. Louis, has awarded a contract to the Wimmer Construction Co., Victoria Building, for a new one-story foundry, to cost about \$55,000.

The Eureka Tool & Oil Well Supply Co., Parkersburg, W. Va., has awarded contract to W. E. Singleton, Winchester, Ky., for rebuilding its Winchester plant, recently destroyed by fire. It will cost about \$35,000. R. N. Russell is secretary.

The Dayton Automobile Co., Dayton, Tenn., has filed plans for the erection of a one and two-story service and repair building, 70 x 100 ft., to cost about \$25,000.

The Delker Brothers Buggy Co., Henderson, Ky., has been incorporated in Delaware with capital of \$300,000 by F. H.

M. J. and A. G. Delker, all of Henderson, to manufacture wagons and wagon parts, automobile equipment, etc.

The Standard-Elkhorn Coal Co., Garrett, Ky., is planning for the construction of a new coal tipple at its properties.

The Wegner-Armstrong Lubricating Co., Tulsa, Okla., is planning for the erection of a new oil refinery, with initial daily capacity of about 500 bbl. C. G. Armstrong is president.

The Jefferson Cotton Oil Mill Co., Pine Bluff, Ark., is planning for the installation of new electrical equipment, including motors and other apparatus.

The St. Louis & San Francisco Railroad Co., St. Louis, is planning for the erection of new locomotive repair shops at Lawton, Okla., to be established in connection with a new engine house. F. G. Jonah is chief engineer.

The Urbauer-Atwood Heating Co., St. Louis, has acquired a site at Second and Barry streets, 180 x 270 ft., with about 40,000 sq. ft. of floor space, in buildings already standing and will install equipment for the manufacture of heating apparatus.

The Foerster & Kaysin Iron Works Co., St. Louis, will build an addition on a site recently acquired.

The Superior Enamel Products Co., St. Louis, will equip a \$50,000 plant at Tenth and Mullanphy streets, St. Louis. Wedemeyer & Nelson are the architects and engineers.

The Spiral Machinery Co., St. Louis, has acquired the plant of the Globe Motor Truck Co., East St. Louis, which it will remodel and equip for the manufacture of a new power drawn plow and tractors.

The Siehoff Packing Co., St. Louis, has acquired a site for a new plant which will involve an expenditure of about \$500,000 for buildings and equipment.

The Bowen Motor Railway Co., St. Louis, Title Guaranty Building, Oliver J. Popp, architect and engineer, will erect a factory and power house at a total cost of \$385,000.

The Kansas City Refrigerator Co., Kansas City, Mo., will equip a two-story building, 80 x 200 ft., for the manufacture of refrigerators.

The Jefferson Cotton Oil Mill Co., Pine Bluff, Ark., is reported in the market for 13 electric motors and other equipment.

California

LOS ANGELES, Sept. 7.

The Clark-Turner Piston Co., 1246 South Los Angeles Street, Los Angeles, has filed plans for a new one-story foundry.

The Lee Tool Co., Los Angeles, has been incorporated with a capital of \$500,000 by D. A. Lay, Harry E. Lee and E. B. Spencer, Pasadena, Cal., to manufacture tools, machine parts, etc.

Fire, Aug. 27, destroyed the machine shop and service building of the White Automobile Co., Santa Maria, Cal., and adjoining machine shop of the Nash & Clevenger Co., as well as battery shop of Lukeman & Woods, with total loss estimated at \$100,000.

The Aro Mfg. Co., 307 Pasadena Avenue, Los Angeles, has been organized to manufacture electrically operated signalling apparatus. C. W. Clement, Pasadena, and H. O. Stock, San Diego, Cal., head the company.

The Pacific Coast Brass & Mfg. Co., Huntington Park, Los Angeles, has been incorporated with a capital of \$150,000 by W. F. Schultheiss and W. F. Schultheiss, Jr., and Frank James, to manufacture brass, bronze and other metal products.

The Mullen Mfg. Co., 64 Rausch Street, San Francisco, operating a general woodworking plant, has completed plans for a new two-story plant 125 x 125 ft., to replace a structure recently destroyed by fire. With machinery it will cost about \$50,000.

The Lap-Rock Tire Co., Los Angeles, has been incorporated with a capital of \$1,000,000 by H. L. and H. O. Averill, and Ross Moore, to manufacture automobile tires.

The Mount Shasta Power Co., San Francisco, operated by the Pacific Gas & Electric Co., 445 Sutter Street, San Francisco, has made application to the State Railroad Commission for permission to issue bonds for \$125,000,000, the proceeds to be used for the construction of five new electric generating plants on the Pitt River.

The Enterprise Brass Co., 968 McGarry Street, Los Angeles, has filed plans for a one-story addition to its foundry.

C. R. Kierulff & Co., 757 South Los Angeles Street, Los Angeles, has been organized to manufacture electrical specialties. C. R. Kierulff, 32 North Wilton Place, heads the company.

The San Joaquin Light & Power Co., Fresno, Cal., is having plans prepared for a new service building and garage at First and Tulare streets, to cost about \$100,000. A new machine and repair shop will also be erected in the Kerman district yards to cost about \$30,000.

The Gonyer-Seydel Ignition Co., 218 East Pico Street, Los Angeles, has filed notice of organization to manufacture ignition equipment for automobile service. E. L. Gonyer, 820 West Fortieth Place, heads the company.

Duncan A. McLeod, San Francisco, will erect a machine shop at West Berkeley, Cal., at a cost of \$55,000. The machinery equipment will cost approximately \$50,000.

The Pacific Car Building Co., successor to the A. Meister & Sons Co., Sacramento, Cal., will erect a car and vehicle factory at Esparto, Cal., which will be ready for the installation of machinery by Dec. 1.

The Pacific Northwest

SEATTLE, Sept. 7.

The general trend of business in this section is light, with fall buying far short of expectations. Price uncertainty still dominates the situation and money for new credits is extremely scarce. Manufacturing continues fairly active, although a few factories with the end of orders in sight have slowed down operations.

The lumber industry shows a heavy slump, where the product would be delivered by rail, as a result of the freight rate increases.

The Todd Dry Dock & Construction Co., Tacoma, has received the contract for an all-steel, full-powered motorship for the Alaska Steamship Co., which will cost \$1,200,000. Cargo capacity of the new carrier will be 6500 tons. The auxiliary machinery and equipment will be electrically driven.

Stanley Dollar, San Francisco, has purchased the Monarch Mills in North Portland, Ore., for \$1,000,000. The plant will be enlarged and equipment installed to operate at a daily capacity of 250,000 ft. It is now cutting 160,000 ft.

The Pacific Western Lumber Co., Portland, Ore., recently incorporated by V. J. Phillips, W. W. Dean and others for \$10,000, plans the construction of a sawmill at Glendale, Ore.

The Nakat Inlet Cannery of the G. W. Hume Co., San Francisco and Seattle, at Nakat Inlet, Alaska, was recently destroyed by fire with loss of more than \$300,000.

Canada

TORONTO, Sept. 13.

Ground has been broken for the new factory of the Imperial Steel & Wire Co., Collingwood, Ont. J. A. Currie, president, states that the new buildings will be much larger than those destroyed by fire in May, 1919, and the plant will be built to give a daily output of about 200 tons of wire. Contracts for the building have been awarded and construction will proceed immediately.

The Taylor Campbell Electric Co., London, Ont., is in the market for a 10 hp. steam roller.

The Bell Furniture Co., Southampton, Ont., is in the market for a single action vacuum pump.

The Dominion Motor Castings, Ltd., Windsor, Ont., has applied for a charter with a capital stock of \$250,000. It is constructing a factory at Windsor with 23,000 sq. ft. of floor space, to manufacture castings for automobiles.

The Ontario Hydro Electric Power Commission, University Avenue, Toronto, Sir Adam Beck, chairman, has started work on the development of Raney's Falls, near Campbellford, Ont., between the present Campbellford and Frankford plants. Two 5000-hp., single-runner, vertical-draft turbines, operating at 47 ft. head at 120 r.p.m., direct connected to the generators will be installed. The plant is expected to be completed and in operation by 1922.

Bids will be called in the near future for the erection of office building, warehouse, power house, garage and tanks for the Imperial Oil Co., Brandon, Man., to cost \$300,000. Charles Hay is local manager.

The Bell Thread Co., Hamilton, Ont., is in the market for a return tubular boiler, 72 in. x 16 ft., 125 lbs. pressure, also one two-phase, 60 cycle, 220 volt motor.

The Andrews Wire Co., Watford, Ont., will build addition to cost \$25,000.

S. Foxworthy, 616 Waterloo Street, London, Ont., has the general contract for a factory costing \$10,000 for the Taylor Campbell Electric Co., Adelaide Street, London. J. M. Moore, 425 Richmond Street, is architect.

NEW TRADE PUBLICATIONS

Die Blocks and Forging Bars.—Pennsylvania Forge Co., Bridesburg, Philadelphia. Catalog 3. Describes various grades of forged and pressed steel die blocks, and lists bar mill products, all made from steel melted in 10-ton acid open hearth furnaces. Tables give weights of die blocks, S. A. E. specifications covering chromium, chrome nickel, chrome vanadium, nickel and carbon steels; weights of carbon bar steel and of flat rolled steel bars; table of decimal equivalents, etc. The catalog is illustrated.

Cotton Waste.—Royal Mfg. Co., Rahway, N. J. Catalog with title "Clean clean thru." Pictures and describes the manufacture of cotton waste from the raw material to the finished, baled product. A page is also devoted to cleaning cloths.

Safety Set-Screws.—Bristol Co., Waterbury, Conn. Bulletin 810. Illustrates and describes a safety set-screw. This is a hollow set-screw made with dove-tailed flutes, thus to provide a maximum surface for wrench pressure.

Factory Buildings with Daylight Sash.—Truscon Steel Co., Youngstown, Ohio. Catalog of 16 pages, 8½ x 11 in., with the title, "Human Nature and the Factory Building." Illustrations of factory buildings constructed with Truscon daylight sash, designed to admit a maximum amount of daylight and to provide for ventilation.

Electric Excavating Shovels.—Westinghouse Electric & Mfg. Co., East Pittsburgh. Circular No. 7132. Describes and illustrates the various applications of electric shovels. The method of electrifying is discussed, and an outline of the choice of equipment and results of recent tests which show the cost per cubic yard of material removed, are given. Tables give the approximate energy consumption of electric shovels and dragline excavators.

Cranes.—Champion Engineering Co., Kenton, Ohio. Two bulletins. One bulletin is largely reproductions of photographs of plants where Champion cranes are in use. Developments of the electric cranes and of their uses for speeding up production are discussed. The second bulletin give mechanical details of Champion cranes, and a geographical list of users. The two bulletins are included under the one cover.

Case Carbonizing.—Driver-Harris Co., Harrison, N. J. Booklet, 111 pages, 5 x 7½ in. The booklet aims to lay before the heat treater in language which can be readily understood, the information which has been rendered available by the more recent scientific investigations. The scope is indicated by chapter headings as follows: Case carbonizing, cyanide hardening, gas hardening, lead tempering and hardening, carbonizing containers, commercial and technical data on nichrome, cast nichrome containers, commercial methods for using nichrome castings, stock patterns and special containers. The booklet is illustrated.

Data Book for Steam Power Plant Operators.—Locomotive Superheater Co., 30 Church Street, New York. Booklet of 79 pages, 4½ x 7 in. with the title "Data Book for Engineers." The purpose of the booklet is to present in condensed form for ready reference the data most frequently desired by steam power plant operators. Factors governing the advisability of using superheated steam are discussed, and numerous tables on factors of evaporation, grate area per horse power, dimensions of various types of boilers, working pressures for tubular boilers, size of chimneys with corresponding horsepower of boilers, dimensions of standard wrought-iron pipe, metric tables, areas of circles, etc., also pertinent formulae, are included.

Automatic Water Heaters.—Thermal Appliance Co., 125 East Forty-sixth Street, New York. Catalog, Form No. 1000. Illustrates and describes the Taco automatic water heater. Line drawings show installations of the heaters. A price list and rating schedule, and a partial list of users, are included.

Dust Collectors.—W. W. Sly Mfg. Co., Cleveland, Ohio. Pamphlet, Form 80. Concerned with dust arresters designed to collect dust to eliminate its injurious effect on employees and machinery, and to collect the dust for its value as a salable product. The operation of the dust arrester is described and typical installations are shown.

Leather Belting.—Chicago Belting Co., Chicago. Booklet with the title "Practical information on the use and care of leather belting." Presents maintenance and installation hints, and gives rules for calculating horsepower, width and speed of leather belting, rules for calculating length of belt, size and speed of pulleys. Various methods of lacing belting are shown. A table gives circumferences of pulleys, and a number of useful hints to belt users are included.

Core Drilling, Rotators and Core Drills.—Sullivan Machinery Co., Chicago, Ill. A booklet and two bulletins

as follows: Booklet 122 presents the company's facilities for undertaking mineral prospecting and test boring contracts with the Sullivan diamond core drills. Bulletin 70-J illustrates and describes rotators, a one-man hammer drill weighing from 29 to 40 lb. for rock drilling. It is equipped with automatic steel rotation and is built in separate air and steam types. It may be used as a hand tool or on a mounting and is for work in ore, coal, hard and soft rock, etc. Bulletin 70-K describes a plug drill for granite quarries.

Signal and Alarm Systems.—C. M. Lovsted & Co., Chicago, Folder concerned with an electric-steam signal system for mills, factories, etc., that require an instant signal for engine-rooms, summoning department heads, fire alarm, emergencies, etc. It can be operated from any distance by push buttons or from a switchboard.

Fractional Electric Motors.—Master Electric Co., Dayton, Ohio. Bulletin 20. Describes electric motors made in sizes of 1/10, 1/8, 1/6, 1/4, 1/3 and 1/2 horsepower. Details of construction are illustrated and explained.

Wrought Iron Pipe.—Reading Iron Co., Reading, Pa. Bulletin 1, 31 pages, 8½ x 11 in. Deals with Reading wrought iron pipe in the making and in service. The origin and development of the wrought iron industry is explained and the puddling process and the manufacture of skelp is discussed supplemented by numerous illustrations. The advantages of wrought iron for making welded pipe are presented and views of pipe installations are given.

Welding.—American Welding Society, 608 South Dearborn Street, Chicago. Booklet with the title "Keep the Guess Work Out of Welding." It presents the objects and purposes of the American Welding Society, Chicago section. The constitution is reproduced, different classes of membership are listed, and names of officers and directors are given.

Water Heaters.—Cutler-Hammer Mfg. Co., Milwaukee. Publication 865. Devoted to electric water heaters of both immersion and conduction types. Three types of immersion heaters; that is, bottom outlet, pipe outlet and circulation heaters, are described. The former is mounted in the bottom of the water container. The pipe outlet heater is used with vessels provided with pipe outlets, and the circulation type heater is inserted in the pipe loop of a hot water tank or other container.

OFFICE CHANGES

The offices of the Engineering Business Exchange, just established by Charles Whiting Baker to bring together those desiring to sell an engineering business—manufacturing, constructing, selling or professional—and those who seek to purchase, are at 31 Nassau Street, New York.

Dwight P. Robinson & Co., Inc., engineer and constructor, New York, has established a new branch office in the Home Savings & Loan Building at Youngstown, Ohio, with C. I. Crippen, formerly of the engineering firm of Crippen & Funk, Youngstown, in charge. Industrial growth and development of the Valley districts have been so marked and offer such promise that the Youngstown office was created, states Dwight P. Robinson, president. The company now maintains district offices in Pittsburgh, Cleveland, Chicago, Dallas, Los Angeles and Youngstown, in addition to the home office. Dwight P. Robinson & Co., Inc., recently acquired through consolidation the engineering and construction firm of Westinghouse, Church, Kerr & Co., Inc.

The Jeffrey Mfg. Co., Columbus, Ohio, has opened a branch office in Buffalo, at 1108 Marine Trust Building, which will be in charge of H. W. Scott, formerly of the home office.

The Stewart Mfg. Corporation, 4500 Fullerton Avenue, Chicago, manufacturer of bronze back bearings and die castings, announces the opening on Oct. 1 of a new branch office at 30 Church Street, New York, in charge of Louis Ruprecht.

The Fawcett Machine Co., Pittsburgh, to facilitate the handling of its business, has consolidated all departments in its new office building at 2818 Smallman Street, adjoining the Pittsburgh works. A downtown office for meetings by appointment will be maintained in suite 1501 Peoples Savings Bank Building, where its allied company, the Schaffer Engineering & Equipment Co., is located.

The Association of Manufacturers of Chilled Car Wheels, Chicago, is now located at 1847 McCormick Building.

The Pennsylvania Pump & Compressor Co., Eaton, Pa., announces the opening of additional sales offices in the following cities: Buffalo, 788 Potomac Avenue, J. B. Laird, manager; Cleveland, 232 St. Clair Avenue N. E., L. J. Wakefield; St. Louis, 1956 North Broadway, Corby Supply Co.; Minneapolis, 423 Fifth Street South, L. E. Pollard Co.; Omaha, 804 First National Bank Building, L. E. Pollard Co.

BOOK REVIEWS

Motion Study for the Handicapped. By Frank B. Gilbreth and Lillian Moller Gilbreth, Ph.D. Pages, xvi + 165, 6½ by 8½ in.; numerous illustrations. Published by George Routledge & Sons, Ltd., Broadway House, 68-74 Carter Lane, E. C., London.

This book is chiefly a compilation of papers given at various times in the years 1917 and 1918 by the authors before various societies throughout the country. It is profusely illustrated, although many of the illustrations are related to the subject matter in a general rather than specific way.

If memory serves correctly, it was about the year 1912 that Frank B. Gilbreth first conceived the idea of making an analysis of any set of motions with the cinematograph. This idea was originally to take the place of what is commonly described in mechanical processes as "time-study." Later Mr. Gilbreth became imbued with the idea of going farther than time-study had attempted, namely, to study and chart all human motions. This led him into a study of surgical operating with so great results that when this country entered war he and his co-partner, Mrs. Gilbreth, placed themselves, together with their accumulated results, at the services of the Government.

So it has come about that the Gilbreths have concentrated on the study of the handicapped, particularly the crippled soldier, and have offered these papers on the re-education of the crippled soldier, his place in industry and first steps in the solution of his problem.

E.C.R.

Inventions: Their Development, Purchase and Sale. By William E. Baff. Pages, xi + 230, 5 by 7½ in. Published by D. Van Nostrand Co., 25 Park Place, New York.

Stating in the preface that "Patents are peculiar property and inventions are peculiar things," the author of the above-mentioned book, with its somewhat unusual title, sets forth much interesting data and much useful advice on the subject of inventions and the problems pertaining to them. Since inventions may be conceived by almost any person, and since, when properly patented, they may have a very tangible value, this book has chapters dealing with the types of inventions from a commercial standpoint, their merits, talking points (as a sales proposition), the demand and market for them, as well as chapters on patents, covering their value and price, how they exclude, and their property values.

Then there are chapters covering the relationships possible between inventors and capitalists, showing how sales of patents may be negotiated, as well as chapters on raising funds and establishing businesses to manufacture and market patented inventions. The book is concluded with chapters on the mistakes of inventors, elementary contract laws and suggestions from the author on every phase of selling inventions.

E.C.R.

The Standard Iron-Steel-Metal Directory. For 1920—fourth edition. Pages 1273, 6 x 9 in. Published by the Atlas Publishing Co., 150 Lafayette Street, New York.

This is a revision of the directory of two years ago, and is essentially for the scrap trade. It lists iron and steel manufacturers, iron and brass foundries, metal producers and manufacturers in the United States and Canada with a report showing the nature of the organization, capital, officers, purchasing agent, sales manager, products, location of headquarters and branch plants, equipment, capacity and raw material used. The publishing company also issues a weekly journal devoted to the waste business, and therefore should be in position to compile the directory. It is not accurate on the more technical features, such as the list of steel manufacturers, where the process used is indicated. For instance, a double dagger opposite a manufacturer represents that this is an "electric plant," whatever

this may mean. If it implies that electric furnaces are used, it lists plants which do not have electric furnaces. An asterisk supposedly indicates that both the Bessemer and crucible processes are employed, erroneously implying that they always go together. According to the summary of contents there is a new feature in the 1920 edition, known as the "foreign department," containing "classified lists of important manufacturers, smelters, jobbers, importers and exporters of iron, steel and metals in the principal cities of the world." However, such lists are found neither in table of contents, index nor subject matter. The book is for sale by the U. P. C. Book Co., 239 West Thirty-ninth Street, New York.

MacRae's Blue Book. Pages 1853, 8 x 11 in. Published by MacRae's Blue Book Co., Railway Exchange, Chicago, and Hudson Terminal Building, New York.

This is the eleventh edition of this buyers' guide and commercial register. The first 300 pages constitute a catalog section of various manufacturers collated in condensed form. This is followed by an address section giving in alphabetical order the addresses of 30,000 manufacturers, with the location of their branch offices and representatives.

Of particular interest to the buyer is a classified material section of 1100 pages, wherein are listed under various classifications the names of manufacturers of railroad supplies, iron and steel products and building construction materials. Blank lines beneath every classification in this section are for the use of buyers as an index to their requisitions, it being necessary only to insert on these lines the date and number of a requisition or order to have an index of purchases made throughout the year.

A trade name index of 100 pages gives the names of manufacturers of many trade-named articles. This is followed by a miscellaneous data section comprised of odds and ends of information from numerous sources and all indexed so as to make the information readily accessible. The book concludes with a section giving the standard list prices of building materials, iron and steel products, etc. A net discount computer is a handy supplement to this section.

The address section is differentiated by yellow pages, the trade names index by yellow pages and the miscellaneous data section by blue pages, the other sections being on white paper.

Structural Steel, handbook No. 16. Pages 319, 6¾ x 8½ in.; numerous section drawings. Compiled and published by R. A. Skelton & Co., London, England, and distributed by Isaac Pitman & Sons, 2 West Forty-fourth Street, New York.

A handbook of British, American and Continental structural steelwork. The first part of the book contains lists of sections and materials, together with the various drawings and tables relating to them. A catalog of rolled steel sections is a concise compendium of 50 or more manufacturers' and merchants' catalogs and comprises 69 lists of the various steel sections rolled in Great Britain, and of the principal American and Continental sections. Chapters follow on British standard joists, broad flange beams, British standard channels, metric and American sections, British angles, British tees, rounds and squares, plates, sheets and flats, rivets and bolts, wire and miscellaneous, plated girders, plated stanchions, girders, and stanchions. The usual safe load tables, tables of weights, section modulus tables, formulae, etc., are included.

The second part consists partly of notes and data on the design of structural steelwork, and partly of general data. Chapters are included on joists in concrete and reinforced concrete, roofs, foundations, weights of materials, notes on steel manufacture and costs of rolling, extracts from standard specifications of tests, code words, standard extras lists, mathematical tables, equivalents, weights and measures.

A number of useful nonograms, that is, diagrams drawn to scale, enable the user to read off a desired value, such as the weight or area of a steel plate, by inspection or by the use of a straight-edge. Some 2400 code words are given in relation to iron and steel sections and structural work. The book is thumb indexed.

Current Metal Prices

On Small Lots, from Merchants' Stocks, New York City

The quotations given below are for small lots, as sold from stores in New York City by merchants carrying stocks.

As there are many consumers whose requirements are not sufficiently heavy to warrant their placing orders with manufacturers for shipment in carload lots from mills, these prices are given for their convenience.

Iron and Soft Steel Bars and Shapes

Bars:	Per Lb.
Refined iron, base price.....	5.75c.
Swedish bars, base price	20.00c.
Soft Steel:	
% to 1 1/2 in., round and square.....	3.63c. to 5.40c.
1 to 6 in. x 3/8 to 1 in.....	3.63c. to 5.40c.
1 to 6 in. x 1/4 to 5/16.....	3.73c. to 5.40c.
Rods—5/8 and 11/16	3.68c. to 5.45c.
Bands—1 1/2 to 6 by 3/16 to No. 8.....	4.33c. to 7.00c.
Hoops	5.68c. to 7.00c.
Shapes:	
Beams and channels—3 to 15 in.....	3.47c. to 4.80c.
Angles:	
3 in. x 1/4 in. and larger.....	3.58c. to 4.80c.
3 in. x 3/16 in. and 1/8 in.....	3.83c. to 5.75c.
1 1/2 to 2 1/2 in. x 3/16 in.....	3.63c. to 5.55c.
1 1/2 to 2 1/2 in. x 3/16 in. and thicker	3.58c. to 5.50c.
1 to 1 1/4 in. x 3/16 in.....	3.63c. to 5.55c.
1 to 1 1/4 in. x 1/4 in.....	3.68c. to 5.60c.
7/8 x 1/8 x 1/8 in.....	3.73c. to 5.65c.
5/8 x 1/8 in.....	3.78c. to 5.70c.
5/8 x 1/8 in.....	4.18c. to 6.50c.
5/8 x 3/32 in.....	5.28c. to 7.20c.
Tees:	
1 x 1/4 in.....	3.98c. to 5.90c.
1 1/4 in. x 1 1/4 x 3/16 in.....	3.88c. to 5.80c.
1 1/2 to 2 1/2 x 3/16 in. and thicker.....	3.68c. to 5.60c.
3 in. and larger.....	3.63c. to 5.30c.

Merchant Steel Per Lb.

Tire, 1 1/2 x 1/4 in. and larger.....	5.40c.
(Smooth finish, 1 to 2 1/2 x 1/4 in. and larger).....	5.90c.
Toe calk, 1/2 x 1/8 in. and larger.....	6.00c.
Cold-rolled strip (soft and quarter hard).....	12c. to 14c.
Open-hearth spring steel	7.00c. to 10.00c.
Shafting and Screw Stock:	
Rounds	6.25c. to 7.00c.
Squares, flats and hex.....	6.75c. to 7.50c.
Standard cast steel, base price.....	15.00c.
Best cast steel	20.00c. to 24.00c.
Extra best cast steel	25.00c. to 30.00c.

Tank Plates—Steel Per Lb.

1/4 in. and heavier.....	3.78c. to 4.80c.
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Sheets

Blue Annealed	Per Lb.
No. 10	7.23c. to 8.30c.
No. 12	7.26c. to 8.35c.
No. 14	7.33c. to 8.40c.
No. 16	7.43c. to 8.50c.

Box Annealed—Black

Soft Steel C.R., One Pass Per Lb.	Wood's Refined, Per Lb.
Nos. 18 to 20.....	8.41c. to 9.90c.
Nos. 22 and 24.....	8.46c. to 9.85c.
No. 26	8.51c. to 9.90c.
No. 28	8.61c. to 10.00c.
No. 30	8.71c. to 10.10c.
No. 28, 36 in. wide, 10c. higher.	

Galvanized

No. 14	8.86c. to 11.00c.
No. 16	9.11c. to 11.25c.
Nos. 18 and 20.....	9.26c. to 11.40c.
Nos. 22 and 24.....	9.41c. to 11.55c.
No. 26	9.56c. to 11.70c.
No. 27	9.71c. to 11.85c.
No. 28	9.86c. to 12.00c.
No. 30	10.36c. to 12.50c.
No. 28, 36 in. wide, 20c. higher.	

Pipe

Standard—Steel	Wrought Iron
Blk. Galv.	Blk. Galv.
1/2 in. Butt... —34 —17	3/4-1 1/2 in. Butt. — 3 +17
3/4-3 in. Butt. —38 —22	2 in. Lap.... + 3 +21
3 1/2-6 in. Lap. —33 —18	2 1/2-6 in. Lap.. + 1 +17
7-12 in. Lap.. —23 — 6	7-12 in. Lap.. +12 +30

On a number of articles the base price only is given, it being impossible to name every size.

The wholesale prices at which large lots are sold by manufacturers for direct shipment from mills are given in the market reports appearing in a preceding part of THE IRON AGE under the general headings of "Iron and Steel Markets" and "Metal Markets."

Steel Wire

BASE PRICE* ON NO. 9 GAGE AND COARSER	Per Lb.
Bright basic	10.00c.
Annealed soft	10.00c.
Galvanized annealed	10.75c.
Coppered basic	10:50c.
Tinned soft Bessemer.....	12.00c.

*Regular extras for lighter gages.

Brass Sheet, Rod, Tube and Wire

BASE PRICE	
High brass sheet	28 1/4c. to 29 1/2c.
High brass wire	28 1/4c. to 29 1/2c.
Brass rod	26 1/4c. to 29 c.
Brass Tube	43 1/2c. to 45 1/2c.

Copper Sheets

Sheet copper, hot rolled, 24 oz., 29 1/2c. per lb. base. Cold rolled, 14 oz. and heavier, 2c. per lb. advance over hot rolled.

Tin Plates

Bright Tin	Coke—14x20 Primes Wasters
Grade AAA	80 lb... 11.80 11.55
Charcoal Charcoal	90 lb... 11.90 11.65
14x20	100 lb... 12.00 11.75
IC... \$16.50	IC... 12.25 12.00
IX... 18.75	IX... 13.25 13.00
IXX... 20.50	IXX... 14.25 14.00
IXXX... 22.25	IXXX... 15.25 15.00
IXXXX... 23.75	IXXXX... 16.25 16.00

Terne Plates

8-lb. Coating 14 x 20	
100 lb.	\$9.35
IC	9.50
IX	10.50
Fire door stock	12.75

Tin

Straits pig	49c.
Bar	60c. to 62c.
Lake ingot	20c.
Electrolytic	19 1/4c.
Casting	19 1/2c.

Copper

Western spelter	10c. to 11c.
Sheet zinc, No. 9 base, casks.....	14 1/2c. open 15c.

Lead and Solder*

American pig lead.....	10c. to 11c.
Bar lead	12c. to 13c.
Solder 1/2 and 1/2 guaranteed.....	38c.
No. 1 solder	35c.
Refined solder	31c.

*Prices of solder indicated by private brand vary according to composition.

Babbitt Metal

Best grade, per lb.....	.90c.
Commercial grade, per lb.....	.50c.

Antimony

Asiatic	9 to 10c.
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Aluminum

No. 1 aluminum (guaranteed over 99 per cent pure), in ingots for remelting, per lb....35c. to 38c.

Old Metals

Prices are unchanged. The same quietness prevails, all metals apparently feeling the effect of the holiday week. Dealers' buying prices are as follows:

	Cents per lb.
Copper, heavy and crucible.....	15.25
Copper, heavy and wirec.....	14.25
Copper, light and bottoms.....	12.75
Brass, heavy	9.50
Brass, light	7.00
Heavy machine composition	15.00
No. 1 yellow brass turnings.....	9.00
No. 1 red brass or composition turnings.....	12.25
Lead, heavy	7.50
Lead, tea	5.00
Zinc	5.25